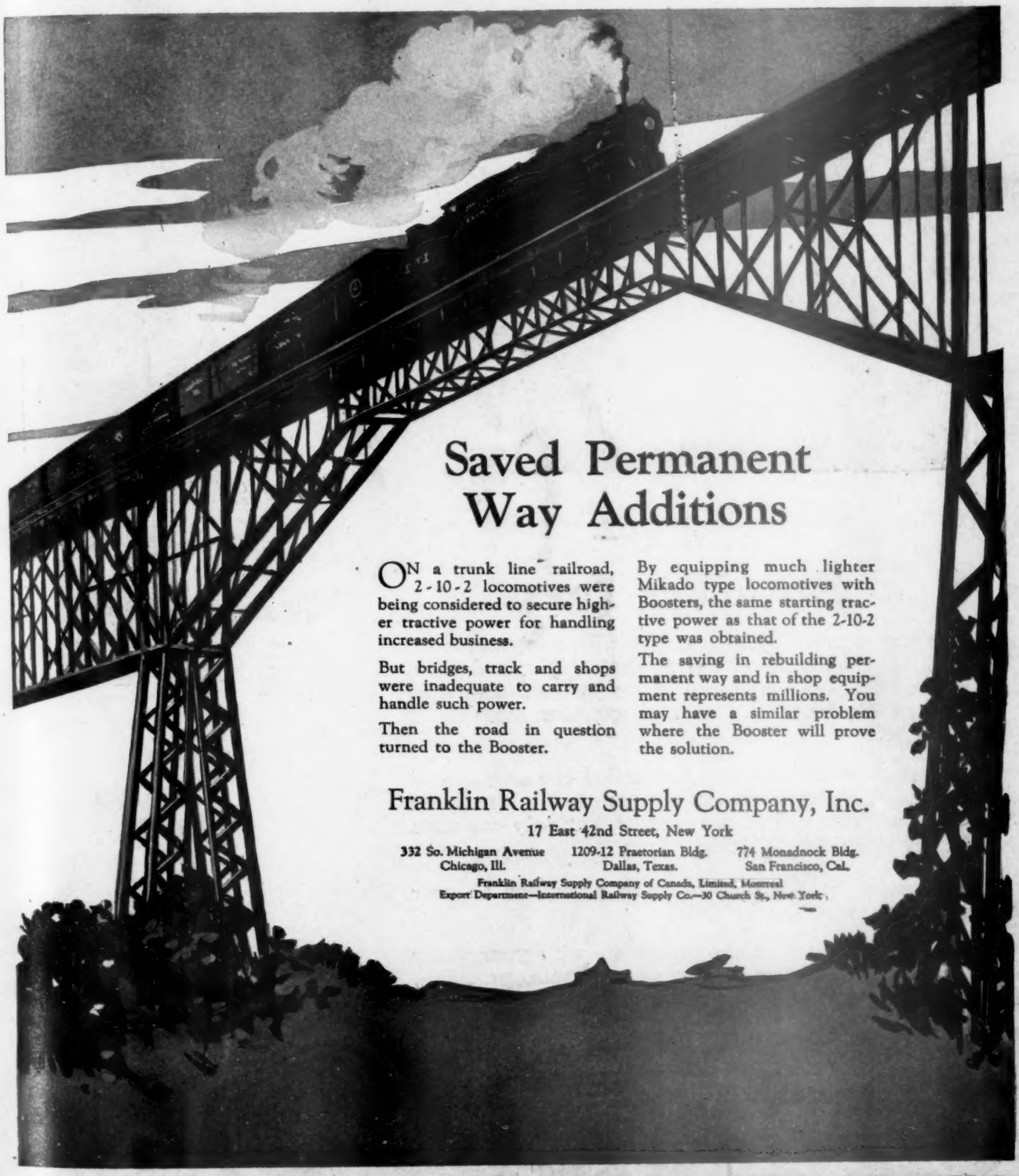
OCT 15 1923

Railway Age

SECOND HALF OF 1923—No. 15 NEW YORK—OCTOBER 13, 1923—CHICAGO SIXTY-EIGHTH YEAR



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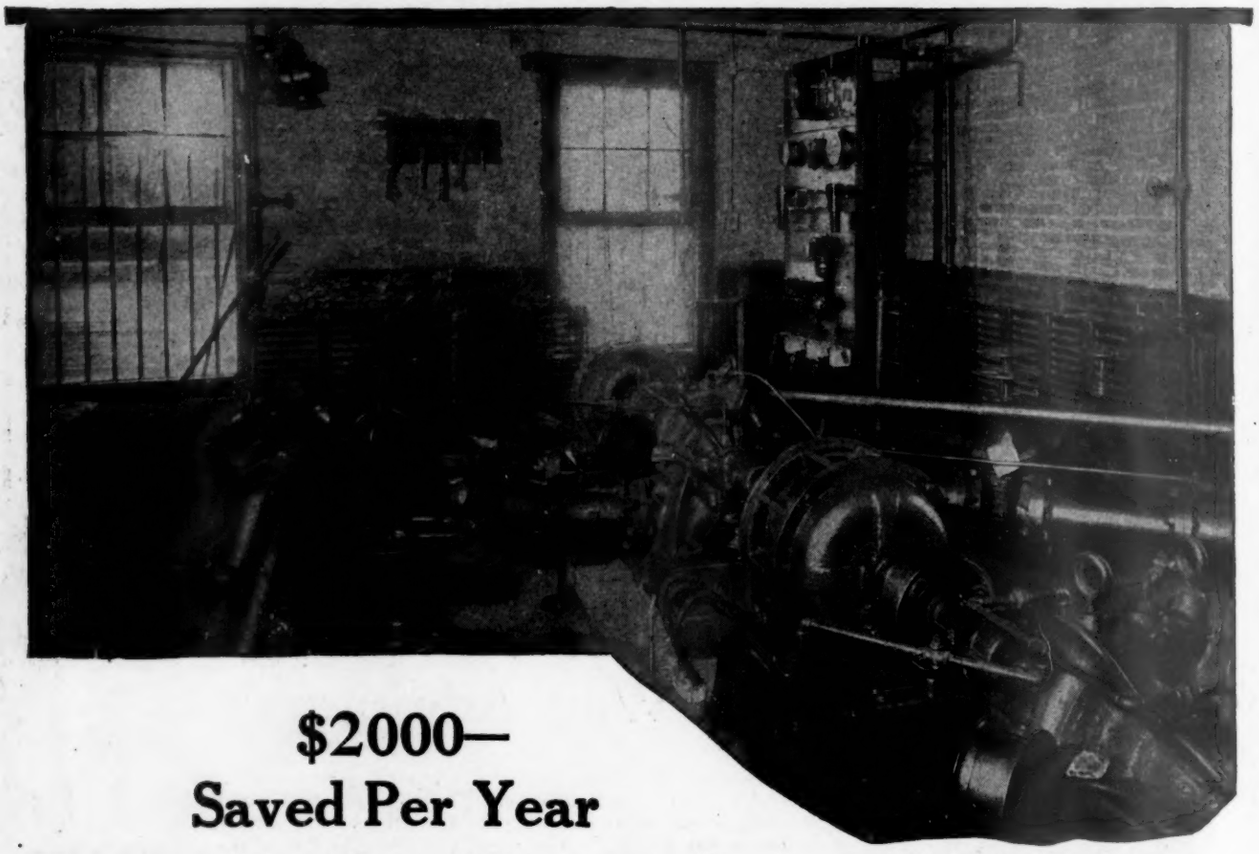
At The Pumping Station



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Installation consists of duplicate units—each having a capacity of 30,000 gals. per hour against a head of 130 ft. The motors are G-E 25 H.P., 3-Phase, 60 Cycle, 220 V., 1750 R.P.M.

The statement of operating results for one year, of the G-E Motor-driven pumping station pictured here, shows 109,368,000 gallons of water pumped against an average head of 105 ft., at a cost, for current, of $2154.35.

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GENERAL ELECTRIC

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Volume 75 Number 15

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EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

How to Prevent Accidents

The Steam Railroad Section of the National Safety Council held a most enthusiastic and productive meeting in Buffalo last week in connection with the Twelfth Annual Safety Congress. The fact was emphasized over and over in various ways during the Congress that most of the accidents are due to mental causes and these can only be done away with by changing the mental attitude and securing the enthusiastic, intelligent and hearty co-operation of the employees. Had it not been for the discussion of various technical details it would have been hard to differentiate between this safety meeting and that of a management or personnel association. It also appeared as if the very great savings which would be made by the reduction in the number of accidents due to mental causes would warrant increased activities and expenditures in developing and carrying on personnel work of the best type. It is rather surprising also, in view of the importance of this safety question, to realize that many of the roads, including some of the larger ones, have done very little in the way of organized safety-first work, and that others who had such work well organized, cut appropriations for this purpose during the depression to a point which practically put it out of business. This seems strange in view of the splendid returns which have been received on a road like the Union Pacific, for instance, which has gone steadily ahead in enlarging and improving its safety organization.

Ton-Miles and the Wheel Reports

No American railroad man would ever need to be reminded of the importance attaching to the unit of ton-miles in railway statistical compilation and analysis. The ton-miles figures are basic. In themselves they are the measure of work done and as utilized to form statistical averages—such as net tons per train, net tons per car, gross ton-miles per train hour, etc.—they furnish also the most important single element in the working up of the units which we utilize to measure operating efficiency. The compilation of figures from the conductors' wheel reports, as done in this country, is sufficiently simple and is done in a sufficiently adequate manner so that while the points above mentioned are realized by everyone, the matter is not given a great deal of thought. Perusal of Major Budden's second article on the revision of the statistics of the Indian Railways, appearing on another page of this issue, may serve, however, to remind American railway operating men how fortunate they are in this connection. Those in charge of the work of revising the Indian railway statistics were apparently ready enough to understand the value of the ton-mile unit, but before they could use that unit in the several ways in which it may be used, they had to work out a system of compiling the basic figure itself. It is rather apparent from Major Budden's article, and from the report on which the article is based, that on his visit to America Major Budden was much impressed by the value of the conductors' wheel reports from the standpoint of the comparative facility with which there are secured from it the ton-mile figures and also as concerns the recording of car movement. It was judged inadvisable to adopt the American method in India because it was felt that the class of labor employed on the trains there would not render reports of sufficient accuracy. As a result, other methods had to be used, a choice lying between what Major Budden calls the "station to station" method and that of "density record," both of which Major Budden describes in some detail. We ordinarily do not give much thought to our conductors' wheel reports. To experienced analysts from other countries, however, they are likely to prove of striking interest.

Reducing Delays at Sidings

Every railway man is familiar with the leisurely manner in which the crews of trains standing on sidings to permit other trains to pass frequently proceed after the opposing trains have passed. When a line is working to capacity every minute such a train consumes unnecessarily in getting under way reduces the capacity of that line to that extent. This is particularly true on single track lines where the movement of one train must be correlated with those of other trains in the opposing direction and dilatory movement on its part may delay several trains which it must meet. The movement of all trains can be expedited materially by the adoption of the practice of requiring trains on sidings to be under way by the time the rear of the opposing train passes. Trainmasters can afford to give this subject special consideration at the present time in order to advance their trains over the road as rapidly as possible and thereby increase the number of trains which can be handled on those lines which are approaching their capacity. This practice will also be found to be beneficial on other lines which are not working to capacity.

Keeping Down the Fire Losses

The week ending today (October 13) is National Fire Protection Week in the United States. The members of the Railway Fire Protection Association will meet in Cleveland next week to consider subjects pertaining to their work. The campaign to reduce fire losses should appeal to the railroads and meet with generous support. The fire that consumed the Pennsylvania's Broad street terminal at Philadelphia, the recent burning of the Santa Fe's bridges, the experience of the New York Central, the Kansas City Southern, the Erie and others with fires in their shops and roundhouses, are not too far in the background to serve as reminders that fire continues to be an ever present danger on railways, as elsewhere. As a matter of fact, railway fire losses are on the increase. The preliminary report of railway fire losses for 1922 places the number of fires at 9,216 and the total estimated loss at $10,184,000. This is an increase of 1,253 fires over 1921 and an increase in the total estimated loss of $2,593,900. Thus, the loss in 1922 by fire, considered only from the standpoint of damage or destruction of property, was one-third greater than during the preceding year. If the total loss was small, this increase, of course, would be of little significance. But, it cannot be said that railway fire losses are small. A loss of $10,000,000 is equivalent to one-fifth of the expenditures made in 1922 for new lines and extensions. It is equal to the

expenditure made for the maintenance of water stations throughout the country. It is equivalent to a charge of $400 for every mile of railroad in the country. The thing to be remembered, moreover, is not merely the loss of property but the confusion and interruptions of operation resulting from the many fires that occur. The railways have a very great interest in fire protection work.

The Blocking of Cars

Recently a certain road, to reduce switching and expedite the movement of its freight trains, gave orders that cars in all through trains should be blocked according to destination. The plan was put into effect and worked well, generally speaking. It happens, however, that on one freight district on this road there is a junction point between terminals through which a considerable tonnage moves to and from the main line. Most trains, therefore, have to set out or pick up at this point, where, incidentally, yard facilities are entirely inadequate. For one thing the tracks are not long enough to hold the trains now being operated and, if a train has to clear the main line, it is necessary to cut off the locomotive and twenty or thirty cars and back them in on another track. Manifestly this is not a place where extensive switching can be done economically. Yet the yardmaster at this point has ironclad instructions to put the cars he adds to trains with their proper blocks. It is not unusual under the prevailing congestion for a train to be delayed an hour or more in picking up a few cars. The yards at the terminals in both directions from this junction point are much better equipped for switching and at those places the blocking could be done after one train crew had been relieved and before the next one was called. It happens that this division is a short one—slightly under 100 miles—and the delay of switching at the junction does not usually result in overtime payments to the train crew. That does not change the situation. The supervising officers should interest themselves in expediting train movement whether overtime is involved or not. Nothing will encourage trainmen to try to make overtime quite so much as a lack of zeal on the part of their superiors in expediting train movement as long as there is no danger of overtime payment. The blocking of cars in trains, as well as any other plan for greater efficiency, should be applied with modifications to suit local conditions. Nothing can so damage the effectiveness of a well-thought-out and workable plan as its unthinking, inelastic application with no modification to meet local requirements.

Bringing Out the Public's View

The most interesting feature which has thus far been developed in the discussion of the disposition of the New England railroads in the Interstate Commerce Commission's consolidation plan is the manner in which the problem has been placed before the public and the manner, as well, in which the public has placed itself on record. For various reasons New England has taken more interest in the matter of railway consolidations than has any other section of the country. The question was considered of sufficient importance so that the governors of the six New England states appointed a committee of thirty, five members being chosen by each respective governor. This committee was known as the joint New England railroad committee, or as the Storrow committee, the latter name resulting from the fact that the chairman was James J. Storrow, a prominent banker in Boston who has taken a leading part in Massachusetts public affairs for many years. This committee, with the assistance of technical experts, studied the New England situation in an investigation continuing over a period of a year. It recently rendered a report to the governors favoring New England regional consolidation for the New England lines and opposing the allocation of the New England roads to the trunk lines. The steps that followed the presentation of the report are of special interest. The report was given wide circulation. The governors, in a public statement, suggested a careful study of its findings and asked for a statement of the views of New England industry concerning them. The governors further chose the committee to represent them in the consolidation hearing before the Interstate Commerce Commission which began in Boston last week. It cannot be said that New England opinion has been unanimous in sanctioning the committee's decision but we believe that it can be said that it has been very nearly so. There has been opposition, notably by such an influential body as the Associated Industries of Massachusetts, by various organizations in New Hampshire, by the Maine Central and by people in Portland who want a trunk line outlet. All of those in favor or opposed showed their willingness to appear on the stand in the consolidation hearing, and a very large number of them did so appear—so many indeed that the hearings continued much longer than had been expected. There is much talk in this country about the desirability of the public's securing an adequate view of the railroad problem. This is what the public in New England has apparently done, and it is unquestionably one of the most favorable aspects of the railway situation as it exists today in that section.

A Remarkable Transportation Situation

THE TRANSPORTATION situation which exists in the United States at the present time is in some respects remarkable. Ordinarily the heaviest freight movement of the year occurs in October. Detailed statistics regarding the amount of freight now being handled will not be available for some time. There is ground for believing that the increase in freight business in October over earlier months of the year will not be as large as it usually has been in October of earlier years. On the other hand, there is reason for believing that the total traffic being handled has continued to increase up to the present time, and is as large as, if not larger, than it ever has been at this time of year.

Nevertheless, the business of the country is not suffering from any shortage of freight cars. On September 1 there was a net surplus of about 57,000 cars. Nobody can say just what the situation throughout the country is at present, but it is probable that while there are local shortages here and there the surpluses in other places exceed these shortages. If cold and stormy weather should come this condition might be quickly changed, but it looks now as if the railways will be able to handle the business the rest of the year without any car shortage. A year ago at this time there was a net shortage of about 140,000 cars.

One reason why the success of the railways in handling the present business without a car shortage is remarkable is that although a large number of new cars have been put in service recently, the number retired from service has been so large that the increase in the last year in the total number available has been very small. The number of new cars actually put in service from January 1 to September 1 was 116,117. A large majority of these new cars were put in service during the first six months of the year. Nevertheless, the number of freight cars owned by the railways increased from only 2,307,397 in June, 1922, to 2,316,225 in June, 1923. The number in service this year has averaged over 50,000 less than in 1920.

It is useful from time to time to view the statistics of the Interstate Commerce Commission showing the improvements in operation which have made it possible to secure these greatly improved results. In spite of the efforts that have been made the railways have not succeeded in securing an average loading of cars equal to that of 1920—with which comparison is made for the reason that in that year the business handled was the largest up to that time. Comparing statistics for the first seven months of 1923 with statistics for the first seven months of 1920 it is found that the average tons carried per loaded car in 1920 was 28.6, while in 1923 it has been 28.2. It is somewhat difficult to account for this smaller average loading of cars. Bituminous coal gives the railways the largest tonnage of any commodity, and its average loading per car is relatively very large. Up to September 22 the railways had transported more bituminous coal than in the corresponding part of any previous year except the war year 1918. The figure for the first 224 working days of 1918 was 429,240,000 tons. For 1917 it was less than 401,000,000 tons and for 1920 about 395,400,000 tons. For 1923 it was more than 402,100,000 tons.

The most remarkable improvement in railway operation, and the one which has contributed most toward enabling the railways to handle the large business in the satisfactory way they have, has been the increase in the average miles traveled by each car daily. In the first seven months of 1920 average miles per car per day was 23.5, while in the first seven months of 1923 it was 27.2. There has been a relative increase in empty car mileage, this having been in 1920 less than 30 per cent of total car mileage and in 1923 about 34 per cent.

The increase in the average miles traveled by each car daily has, however, more than offset the adverse influences of the decline in the average loading per car and the relative increase in empty mileage, and in consequence the average tons of freight moved one mile daily with each freight car has increased from 473 in 1920 to 507 in 1923.

It is evident from the statistics that except for the success the railways have had in increasing average miles per car day they would have been unable to have handled the large business they have without serious delay and car shortages. Their achievement in increasing average miles per car per day as they have is so noteworthy that consideration should be given to what has made it possible. In spite of the large number of new cars acquired recently it does not appear to be due to improvement in the average condition of cars. The reports indicate that cars in bad order in the first seven months of 1920 averaged 6.8 per cent of the total number, while in the corresponding part of 1923 they averaged 8.7 per cent. One very important reason for the improvement in the operating results secured is indicated by the fact that in the part of 1920 mentioned the average number of serviceable locomotives was 22,508, while in 1923 it averaged 25,076. This was an increase of 2,468, or about 11 per cent, in the number of serviceable locomotives available. Because of the increase in the average tractive power of locomotives and the improvements of various kinds that have been made in them, the railways have not only had more but better locomotives than in 1920. The greater hauling capacity of the locomotives has been used to good purpose. The average number of freight cars hauled in each train in the first seven months of 1920 was 35.8, while in the corresponding seven months of 1923 it was 39.2. This increase in the number of cars per train caused an increase in the gross tons per train from 1,417 tons to 1,518 tons. In spite of the increase in gross tons per train the average speed of trains was increased, it being 10.4 miles an hour in 1920 and 10.7 miles in 1923. During the present year the railways, in spite of the effects of the shop strike, have had more serviceable locomotives available than ever before in history.

Even with the increase in the number and pulling power of the locomotives they could not have handled the business as they have if there had not been year by year some enlargements of terminals and other facilities and improvements in operating methods. Fortunately, every enlargement of terminals, even though small, is permanent, and the operating officers have shown this year that their ability to improve operating methods is just as great as it ever was in the past. We include in the term "operating officers" the officers of the American Railway Association, and especially those of the Car Service Division. There can be no question whatever that the activities of the Car Service Division in bringing about better co-operation between the various railways and securing a good distribution of cars have been among the important factors in causing the improvement in operating results.

While the railways and the public are to be congratulated upon the way a record-breaking traffic has been handled, it is easily conceivable that the success attained in handling it might make a false impression upon the minds of railway officers and the public which, in the long run, would do harm. If it should cause the impression that there is no need for a great increase of railway facilities it would do harm. The increase in tons carried one mile thus far this year has been about 7 per cent over the previous record business in 1920. This is a large increase but not an abnormal one. The notable fact is not the amount of the increase in business, but the marked efficiency with which the railways have handled it. It should not be overlooked that conditions have been highly favorable to efficient operation. In truth, it is doubtful if there ever was a year when, on the whole, conditions were more favorable to efficient operation than they have been this year. Whether the traffic will continue to increase during the next year nobody can safely predict, but that within the next five years and the next ten years the demands made upon the railways will very largely increase there can be no serious question, and the increase in traffic to be handled will make necessary a corresponding enlargement of facilities and continuance of the improvement in operating methods.

The Master Key to Progress

A SPEAKER at a large meeting of people of more than ordinary intelligence in one of our eastern cities recently asked for a show of hands as to those who had any knowledge of several important phases of international relations. An exceedingly small proportion of those in the audience acknowledged having any information or opinions on these particular things. The question was asked as to whether they had any opinion as to the League of Nations. Practically every person in the audience indicated that they had such an opinion. The speaker then pointed out how ridiculous it was to have any real opinion on this question without having a thorough knowledge of those things about which the audience had professed entire ignorance.

One suspects that many of the people who speak with apparent authority on the railroad problem frequently have just as little ground for expressing an opinion on it. In light of this the following incident is most refreshing. A keen business man, after long study and experience, came to the conclusion that his particular industry could never prosper as it should until the general business of the country became stabilized; looking further into the problem, he came to the conclusion that transportation was the key to the situation. Unless it is so fostered that it can develop to meet the growing needs of the country, general prosperity and the stabilization of business in general is sure to be adversely affected.

This man had served as a locomotive fireman for several

years, more than a quarter of a century ago. He therefore had some knowledge of operating conditions at that time. He decided to look personally into operating conditions today and, dropping his business, gave several weeks to a study of the situation, interviewing many practical railroad officers and employees, and others who are deeply interested in and closely informed as to the railroad situation. He even went so far as to ride on one of our modern locomotives, in order that he could study the operation and efficiency of the locomotive as compared to conditions 30 years ago. The findings are given in an article on another page of this issue, in the form of the presidential address by Edward J. Kearney before the recent meeting of the National Machine Tool Builders' Association. Mr. Kearney believes that "mechanically the railroads are on the way to handle the ever-increasing volume of traffic and to do it so much more economically as to give promise of ultimate freight rate reductions." He emphasizes the fact, however, that in order to insure this a government policy must be maintained which will be favorable to the development of transportation and will encourage the investment of the vast capital which will be required to improve the facilities and equipment.

Mr. Kearney is to be commended for the thorough way in which he has gone into the situation. He can speak with authority, for he has given much time, at a considerable sacrifice, to ascertain the real facts and to secure first-hand knowledge about equipment and operating conditions. It is unfortunate that many of those who speak with apparent authority on this subject, do so with only a superficial knowledge of the question and without giving adequate time to studying the problem and getting at the real facts. The future prosperity of our railroads would be insured if those who are destructively criticising them would follow Mr. Kearney's example in getting first-hand information and actual facts about railroad equipment and operation.

Should Treated Ties Be Placed First in Main Line Tracks?

WHEN CONSIDERING the use or the extension of the use of treated ties, a railway management is confronted with the necessity of deciding whether these ties should be placed first in main lines or in branch lines, because it is seldom that a road launches on a program of preservation sufficiently broad to cover its entire requirements at once. If the practice which has been followed most generally to date is accepted as the criterion, they should go into the main lines first. However, the subject is so important and the expenditure so large that it warrants thorough consideration.

It is the busy main lines that carry the heaviest traffic. It is here that the life of ties is shortest because of the severity of the service required of them. Furthermore, these lines must be maintained to higher standards, while the volume of traffic handled warrants the expenditure of larger sums for maintenance. Treated ties cost more than untreated ties and the first effect of adopting them is to increase the tie renewal charge, for the economy comes only after the normal life of the untreated timber is exceeded. All of these considerations have influenced the very general use of treated ties first and frequently exclusively in main lines.

There are, however, other considerations. Ties fail from decay and from mechanical wear. The first is largely independent of traffic while the other varies almost directly with it. The injection of preservatives into timber protects it against decay, but exerts little or no effect on its resistance to mechanical wear. It is capable of ready proof that the life of ties, treated or untreated, is shorter in main lines than in branch lines but this is due to the greater volume of traffic with its correspondingly heavier mechanical destruction.

Since decay, except insofar as it is accelerated by mechanical destruction of the timber, is independent of traffic and since preservative treatment increases the resistance of timber to mechanical injury but little, if at all, it is evident that a greater relative increase in the life of ties is secured from treatment if they are installed in branch lines than in main lines.

An obstacle to this practice is the fact that the low earnings of many branch lines cause executive officers to hold expenditures for the maintenance of these lines to the minimum. As already stated, the first effect of the installation of treated ties is to increase the charges for maintenance. However, the ultimate effect is to reduce the charge to this account and as the reduction is larger relatively here than on the lines of heavier traffic, these lines should receive serious consideration when the adoption or extension of a treating program is contemplated.

Co-operation from the Labor Unions

A VERY GREAT CHANGE in attitude has taken place during the past year as to the possibilities of improving the relations between the managements and the employees. The shopmen's strike proved disastrous and costly, to all concerned; moreover, it was clearly evident that the public will not stand for any interruption to traffic due to differences within the railroad organization. Some way must be found of adjusting difficulties without resorting to brute force.

In the *Railway Age* of June 16 we published an article from William H. Johnston, president of the International Association of Machinists, on "Organized Co-operation on the Railroads." He indicated that the policy of the standard railroad unions representing the shop crafts, is now to encourage organized co-operation looking toward increased efficiency on the part of the workers. He suggested that "unions and managements in co-operation may, with proper technical advice, discover and apply more efficient methods in a way that would be impossible for management acting alone." He also suggested that an experiment was being tried out on one of the railroads looking toward this end.

It is pretty generally known that the road to which he referred is the Baltimore & Ohio. The development which he mentioned has hardly been in effect long enough to secure comparative figures to show just what it has meant in a concrete way. Reports, however, would seem to indicate that it is meeting with very great success. One of the men who has had much to do with this development is O. S. Beyer, Jr. He was formerly in the motive power department of the Erie Railroad, was on the staff of the general superintendent motive power of the Rock Island, and later was detailed as a general foreman at one of its shop plants. Later he was connected with the railroad engineering department of the University of Illinois and during the war was engaged in personnel work in the Ordnance Department.

We asked Mr. Beyer some time ago to supplement for us Mr. Johnston's article on co-operation, going more carefully into the exact way in which the right sort of co-operation can be worked out to the satisfaction of both the employees and the managements. Mr. Beyer, whose article will be found on another page, believes that the standard labor organizations can render a distinct service in bringing about greater efficiency, better quality of workmanship and elimination of waste. In other words, they can develop a constructive program which will be productive to all concerned including the employees, the public, the investors and the management. In return for this, the management must, how-

ever, "declare its willingness to help labor in the solution of some of its acute difficulties." To this end he suggests, for instance, that a fair division of the proceeds resulting from the joint efforts of labor and management must be recognized in principle. The next most important factor is that steps should be taken to regularize or stabilize the jobs of the normal forces. It would seem that with the employees collectively using their efforts in a constructive way to increase railroad efficiency, there would be little difficulty in getting together on the wage question. Unless greater efficiency can be developed, however, the future of the employees and the railroads is not very bright under present conditions of public regulation.

The question of stabilizing employment is one in which the railroads are vitally interested. Secretary of Commerce Hoover and leading engineers of this country are keenly awake to the necessity of taking every possible step to stabilize industry and employment and the railroads can be a large factor in this development, provided the public regulating authorities will allow them to earn a sufficient return so as to encourage investment in railroad securities and thus make possible the procuring of a vast amount of capital that will be required to put them in position to meet the growing traffic and to stabilize purchases and conditions in the maintenance departments. Mr. Beyer's suggestions are well worth careful study. Further light will undoubtedly be thrown upon them when more information is available as to the developments and results on the Baltimore & Ohio.

New Books and Special Articles of Interest to Railroads

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Control of Industry, by Dennis Holme Robertson, with introduction by John Maynard Keynes. Cambridge Economic Handbook No. 4. Modern relations between employers and employees and stockholders. 171 p. Published by Harcourt, New York.

Irish Railways. Report of Commission Appointed by Provisional Government. [to the Dail Eireann] 29 p. Published by the Stationery Office, Dublin, Irish Free State. "To be purchased through Messrs. Eason & Son, 40 and 41 Lower O'Connell Street, Dublin."

Methods of Procuring and Computing Statistical Information of the Bureau of Labor Statistics. U. S. Bur. of Labor Statistics Bulletin No. 326. Sources of and handling of figures used in wage compilations, price compilations and so on. 54 p. Published by the Government Printing Office, Washington, D. C.

Midland Traffic Working. The Train Control System of the Midland Railway. The Midland is now part of the London Midland & Scottish System. Describes successful scheme of centralized train dispatching. 53 p. Published by the Railway Gazette, London, Eng.

Some References to Discussions of Freight Classifications and Class Rates, compiled by the Library of the Bureau of Railway Economics. 14 type p. Issued by the Library of the Bureau, Washington, D. C.

History of the Union Pacific: A Financial and Economic Survey, by Nelson Trottman. 412 p. Published by Ronald Press, New York.

Labor's Money, by Richard Boeckel. Survey of expansion of labor banks. Reviewed by G. Gould Lincoln, under title: *Labor of U. S. Meeting Capital on Own Ground,* in Washington Star, Sept. 30, 1923, ed. sect., p. 1. 181 p. Published by Harcourt, Brace & Co., New York.

New York State Miscellaneous Labor Laws, With Amendments, Additions, and Annotations to August 1, 1923. Issued under direction of Bernard L. Shientag, Industrial Commissioner. Laws affecting railroad labor, p. 93-107. 169 p. Published by J. B. Lyon Co., Albany, N. Y.

State and Municipal Ownership From the Insurance Man's Point of View, by Henry Swift Ives. 19 p. Published by Casualty Information Clearing House, Inc., Chicago, Ill.

Trend of Public Accidents in the United States. Railroad accidents of all kinds in comparison with other accidents. Report of the Committee on Public Accidents of National Safety Council. 30 p. Published by National Safety Council, Chicago, Ill.

The Wall Street Journal In Its Beginnings. "Studying the railroads," p. 12-14. 24 p. illustrated. Published by Doremus & Co., New York.

Periodical Articles

The Agricultural Situation, by Henry Wallace, Secretary of Agriculture. "Railroads could help" by reducing rates, especially eastern roads, p. 7. Southern Planter, September 15, 1923, p. 6-7.

An Alsatian Railway Poster Artist, by Frank R. Arnold. Characteristics of work for railways of Alsace and Lorraine of Hansi, the great French artist. Poster, September, 1923, p. 16.

Art and Advertising, London Underground Railways' Publicity Service, by Harold R. Willoughby. Unusual things that one railway is doing, with reproductions of some of the more striking posters including that of Stephenson's *Rocket,* p. 447. American Magazine of Art, August, 1923, p. 441.

Blessed Be the Mapmakers! by N. Joyce Wandring. A not-too-serious article considering among other things "the engaging features of railway maps" p. 77. Vanity Fair, October, 1923, p. 77, 114.

The Kansas Court of Industrial Relations, Its Spokesmen, Its Record, by Herbert Feis. Quarterly Journal of Economics, August, 1923, p. 705-733.

Our Chained Prometheus—the Coal Problem and Its Solution, by Robert W. Bruère. Coal consumption and traffic of railroads, steam vs. electric locomotives and other relations to the railroad situation, p. 613-15. Harper's October, 1923, p. 609-616.

Snowbound on the Trans-Andine, by Charlotte F. Childs. Winter difficulties in railroad operation illustrated with some exceptional photographs. World Traveller, September, 1923, p. 16-17, 36.

Why Not A Section 15-a For Farmers? by Arthur Capper. The junior Senator from Kansas comments on the relations of railroads to the agricultural distress. Kansas Farmer and Mail and Breeze, September 15, 1923, p. 5.

The Controlling Factor in Trade Cycles, by J. R. Bellerby. "Although the revival of trade takes place simultaneously in many industries, it might be advisable to follow the diffusion of business activity which arises from the recovery of one industry alone, say that of railway transport." p. 309. Economic Journal, September, 1923, p. 305-331.

Forward Move in Transportation, by Lowell Mellett. Announcing a national transportation conference, with principal topics and personnel of committees. Nation's Business, October, 1923, p. 18-21.

May Celebrate Centennial, First American Railroad, by W. B. Calloway. Short history of the Baltimore & Ohio. Sample Case, October, 1923, p. 17-18, 42-44.

Some Freight Rates Are Too Low. It's the Long Haul Car Load That Carries More Than Its Share of Burden, by Robert S. Henry. Nation's Business, October, 1923, p. 22-23.

Test Code for Locomotives. Preliminary Draft of Code No. 15 in the Series of 19 Being Formulated by the A. S. M. E. Mechanical Engineering, October, 1923, p. 602-610, 625.

The Employee Morale Problem of Our Railroads

An Approach to Its Solution Is Suggested—Responsibilities of Managements and Men

By O. S. Beyer, Jr.

RECENT EVENTS in the history of American steam transportation have brought the whole subject of railway employee morale prominently to the front. We have had several very striking examples of the effect of a low *esprit de corps* on the efficiency and quality of the service. The conclusion cannot be escaped that one of the supreme tests of a successfully conducted railroad system is the extent to which willing co-operation exists between the management and the workers. Unfortunately, not sufficient significance seems as yet to attach to this test, but circumstances which should be apparent to everybody are forcing the recognition of its importance.

It must be admitted that an unprejudiced approach to the task of building up the morale of the service is, as matters stand in the industry today, not at all simple. So much of human feeling and prejudice is involved that most individuals actively engaged in the conduct of our railroads cannot detach themselves sufficiently from their own peculiar situations to regard so complicated a subject with any degree of rationality. Nevertheless there is an approach to the problem, considered in its largest aspect, which, if invoked should result in real and lasting progress in its solution.

The Approach to the Problem

One of the very first and most important questions which the railroad manager who desires to secure results in this phase of railroad operation must answer, is whether the relationship between the company and its employees shall be on the "individual" or "collective contract" basis. If the latter, shall the collective contract be with an organization strictly confined to the railroad in question, and absolutely unaffiliated with and unrelated to any other organization of workers, or shall the agreement be with one or more of the standard unions, *i.e.*, the Brotherhoods and the American Federation of Labor organizations?

I believe that the more intelligent, progressive and fair-minded managers of our railways agree that certain very decided advantages result from the "collective agreement" as against the strictly "individual contract" which prevails, for instance, almost entirely throughout the iron and steel industry. Public policy, as reflected by the Transportation Act and various decisions of the Railroad Labor Board, also endorses the idea of the collective agreement. The preference of the one over the other, from the strictly theoretical viewpoint, therefore, does not require further elaboration. The processes of personnel administration, the adjustment of wage rates, the establishment of proper working conditions and the control of disciplinary methods are much better furthered through a system of conferences between duly elected spokesmen for the workers and representatives of the management.

Differences of opinion arise, however (in regard to some classes of employees) when it comes to making a choice between what has come to be known as the company union form of organization and the standard railway craft unions. Superficially, the choice may appear to be an easy one. Indeed, if fundamentals such as the value of economic strength derived through affiliation with other organizations for bargaining purposes is ignored and faith is simply had in the desire of the management to be fair in its decisions affecting the welfare of its employees, then the choice between the company union and the affiliated union would be simple.

But, alas, we live in a world of human institutions. Despite the tremendous progress of science in classifying and standardizing our concepts, we still have an untold distance to go before employer and employee will call to mind exactly the same image when a "fair wage," "proper working conditions," "justice," and "right" are to be defined. For in the last analysis, it is the willingness of both parties to continue to work together subsequent to an attempted definition of such terms, which for the time being establishes their correctness. So, since in the long run the fairness of conditions of work is directly a function of the relative bargaining power of management and workers, it follows that that which strengthens the workers collectively in their position before management tends to contribute to a more equitable definition of their working conditions.*

Aside entirely, however, from the simple and otherwise desirable consequence of a more or less equal balance of bargaining powers, a result is secured which goes much further than is ordinarily imagined in laying the foundations for a real, healthy *esprit de corps*. When all is said and done, that which is secured by virtue of one's feeling of independence, economic security and conscious strength in bargaining, leaves one with the feeling that one has not been outdone or deprived of that which is fairly due. In short, the prevention of a general feeling of inferiority, the "inferiority complex" as it is popularly termed these days, has a value all its own and is very important in the development of the morale of industrial workers. Apathy and servility are not of the essence of a vigorous ideal of service.

In addition to these considerations, others of perhaps equal importance might be advanced to show that a constructive attitude towards the affiliated organizations has further merit. The effort to organize unorganized and unaffiliated railroad workers is bound to continue until universal recognition of their unions in some form is achieved. The attitude of the unions towards management and the industry may have to change before this state will be reached in its entirety. It is quite safe to predict that such changes will take place; that is, the unions for their part adopting a more constructive attitude towards the railroads. But organizing efforts will go on and as such cannot be ignored by management if it is desirous of facing the realities of the situation. Unionism will grow despite all efforts to prevent it, as history since and even for centuries before the industrial revolution demonstrates. Indeed, the very existence of the unaffiliated or company union, if it is a truly democratic institution uncontrolled and uncontrollable by management, is not only an adjustment in the direction of standard unionism, but also opens the way for the conversion of these special organizations to those of the more orthodox type. If, therefore, the standard organizations are really able and willing to function constructively with management, the question naturally arises, would or would it not be best in the end to establish

* The foregoing argument is, of course, premised directly upon the hypothesis that the bargaining power of management, representing the investments of property and responsible to the public through such agencies as the Interstate Commerce Commission, enjoys much greater strength in its bargaining position than do the present-day wage earners, no matter how effectively organized. I might add that the validity of this hypothesis is not disputed by well informed and intelligent students of the situation.

a clean-cut, wholesome relationship with these organizations? Would it not result in either forestalling or putting an end to the costly and ultimately futile resistance to the normal development of trade unionism in the railroad industry?

The longer the attempt to organize continues, the more bitter the struggle is apt to become, and hence the more serious will be the misunderstandings and the graver the differences which must eventually be healed. It is the ever-increasing difficulty of establishing real confidence between management and workers the longer the unions are considered anathema, which constitutes no less a menace to a better morale than the other factors involved in the situation.

Theoretically, perhaps, most railway executives might agree with the above reasoning were they not motivated by a complexity of past experiences with the standard organizations, their own notions of authority, their own idea of values and the dignity of their official positions. The practical situation as it confronts them is what counts. This is the material with which they must work. In the abstract unions may be ever so desirable, their recognition may indeed provide the foundation upon which to build the very best *esprit de corps* possible. But, they argue, our only too recent experience with these organizations has taught us that they can and will, irrespective of our best intentions, do great harm to our railroads by striking, if certain conditions are not modified to suit their ideas. It is not what is theoretically possible, but what has actually happened, which guides most practical railroad men in their decisions. Many an executive thus finds much to confirm his prejudices about organized labor.

So if we take the standard organizations simply as they are supposed to be, most railway managements will regard them as necessary evils to be tolerated at best, whose activities must be kept within the narrowest possible limits. That it is a legitimate and worthy function of management to regard them in a broader and more wholesome light and to encourage responses from them in the direction of collective service, greater efficiency, better workmanship, elimination of waste; in other words, the assumption of greater responsibility for the welfare of the industry, seems never to have occurred to the average executive. He apparently cannot conceive that a railroad labor organization either could or would have any concern for the industry as a whole, other than as a source for higher wages and easier working conditions.

What, then, are the responsibilities of organized labor if the potential benefits accruing to the railroad industry from a wholesome relation with the regular agencies of labor are to become realities? No impartial student of the situation would maintain for a moment that the organizations have always in the past revealed a detailed concern for the many serious problems of management. Under the scheme of things as they have been, it was not within their province to do so. Organized labor on the railroads has been a defensive and at times militant alliance chiefly concerned with protecting the welfare of the human plant, as against the concern of management for the property investment or physical plant. In maintaining their respective integrities, the problems of the one were minimized in the eyes of the other. The result has been anything but co-operation in meeting their common difficulties. As can readily be seen, no such co-operation is possible as long as management insists upon interfering with the normal development of the regular labor organizations. The moment, however, this interference ceases, the first agreement in meeting one of the serious problems of the workers has come into being. The path will henceforth be open and the foundation available upon which to build machinery for jointly contending with difficulties of mutual concern.

No matter how we regard the task before us—*i.e.*, the best policy for building a genuine and lasting morale—the initial move and major responsibility for making it rests with management. But obviously the admission that the best policy is based on clean-cut recognition and co-operation with the standard organizations, will be the more readily forthcoming when organized labor as such gives tangible evidence of its desire to help in bettering railroad operating efficiency and improving service.

A Labor Service Bureau

So the question naturally arises, of what might such tangible evidence consist? The assumption of a measure of responsibility for the welfare of railroading by the labor organizations implies the establishment of a Labor Service Bureau by these unions for the good of the industry. Just as, for example, the large supply companies who now furnish our railroads with specialties and materials, such as brick arches, superheaters, air brake equipment and lubricating oils, send their experts out over the properties to demonstrate and help the managements in the efficient and economical use of these supplies, so might the railroad labor organizations create their own Service Department and send out experts to educate and help managements and their own local people in the more efficient and economical use of the human organization.

For after all, are not the unions, interested as they are in the human side of railroading, the most logical and satisfactory agencies to tackle problems of this very nature? The complicated but fascinating "human problem" is the very problem concerning which they should have the greatest fund of information, in the solution of which they should be most expert and in which they should have the greatest interest. So it remains for them to devise a constructive approach to this problem, an approach which is scientific and inclusive of all ramifications—its relation to production, to safety, to economy, to quality of work, to discipline, to compensation. No better administrative measure could therefore be adopted by organized labor than to establish such a Service Bureau and retain individuals properly qualified by actual experience and knowledge to assume the tasks of adapting the union organization to constructive railroading in addition to its present task of conserving the well being of the industry's soldiers. If this step is taken it will be difficult to see how railroad managements can hereafter fail to consider the unions as assets and accept their co-operation.

Management's Responsibilities

Manifestly, when organized labor takes the constructive attitude outlined above it becomes the duty of management to declare its willingness to help labor in the solution of some of its acute difficulties. Chief among these is of course the wage question and the problem of regular employment. Working rules and disciplinary methods, while very important, do not ordinarily precipitate the acute difficulties which result from an inadequate and unstable source of wages or irregular employment.

As for the wage question, a fair division of the proceeds resulting from the joint efforts of labor and management must be recognized in principle. Thus, among other things, the arguments during wage negotiations are shifted from the dubious cost-of-living basis to the basis of service and productivity. And at such times attention is most intensively focussed on the main purposes for which a railroad really exists; namely, to furnish transportation, provide its employees with an opportunity to make a decent living and reimburse its investors at fair interest and dividend rates. Wage negotiations conducted under these auspices, having adequate regard for the statistics of railroad performance and the facts of economics all properly expressed, will lend a new tone and dignity to the whole procedure. And with the idea of co-operation predominating, a more wholesome sense of responsibility will temper the attitude of each in respect to the difficulties of the other. The result will be a

far more equitable and satisfactory solution of this most thorny of all problems in railroad economy.

A policy of co-operation with labor for more efficient and economical operation brings the subject of stable employment definitely to the fore. It will be difficult indeed to accomplish a program of co-operation if the more intensive effort, both individually and collectively, of railroad employees should be rewarded by a furlough every now and then. Such a result, the only too common experience of the past, would soon disillusion the most ardent advocate of co-operation among the workers.

The management therefore, coincident with progress in the development of the machinery and the spirit of co-operation, must take steps to regularize the jobs of the normal forces. Fortunately, much indeed can be done by our railroads in this respect, especially in the maintenance departments. Suffice it to point out here the necessity of management giving this subject most careful and intensive consideration and in conjunction with the proposed labor service bureau, working out a practical plan and putting it into actual operation.

The Immediate Prospect

What does the general situation as it actually prevails today offer along the foregoing lines? First and foremost, it is a fact that approximately 75 per cent of the two million workers on our railroads are members either of the organizations affiliated with the American Federation of Labor or of the Brotherhoods. On matters of large policy, especially in relation to the railroad industry, there is the closest agreement and co-operation among these organizations. Despite the partial defections from the ranks of the shop workers, the predominating employees' attitude today is shaped by these organizations. And there is not the remotest prospect that they will ever relinquish the field. It is not, and from the nature of things, cannot be in the winds.

In other words, the institution of collective bargaining recognizing the standard organizations as speaking for at least 75 per cent of the railroad employees, is by all odds the most significant and enduring phenomenon affecting the relationship between management and personnel on our railroads. Since its existence it may only have concerned itself with the simple welfare of the human plant. It may have been entirely negative in respect to the all-inclusive welfare of the industry or the large and complicated problems of management. It may indeed even have added to these problems. But despite these facts, it has grown and waxed strong. No matter, therefore, how we regard collective bargaining and the organizations behind it, we have a phenomenon which has become indigenous to the railroad industry.

The wise railroad executive, therefore, who looks at his industry in a statesmanlike way, will take full cognizance of this fact. He will see that there *is* a next step in collective bargaining which, if it can be taken, will enhance the value of this institution and replace its purely negative features by constructive ones. He will see that for the unions there is the opportunity to assume responsibility for service, quality of work and output in response to their recognition, and in return for the wage rates and working conditions they negotiate with management. He will see that he can thus acquire two million faithful and enthusiastic supporters of his industry, a vast army of agents of good will, who are helping him improve the industry, find new business and assist in its growth and prosperity. And an army of two million, scattered all over America, into every quarter served by a railroad car, engaged in selling the railroad and its service, is worth a thousand times the millions now being spent on "Let the Railroads Alone" advertising, or dubious outside agencies to stimulate employee morale and in resisting the development of legitimate organized labor.

But the prospect for a better morale along the lines suggested from the union viewpoint, looms up still more promising. One of our most prominent railroads, whose management has the intelligence to conceive the standard employee organizations in the light indicated, is at present enjoying the assistance of many of these organizations, especially those of the shop crafts, in improving morale, quality of work, output and service. The performance of this property since the settlement of the shop strike a year ago gives every indication of the soundness of this policy. The goodwill of the shipping and traveling public which it is winning, the fine service which it is rendering, the economy with which it is being operated, the decided improvement in its financial situation, the willing co-operation which it is enjoying with its employees, are in no small measure the reflex of its intelligent policy and the ability of the organizations to measure up to the test of this policy. The fact that the shop craft unions are actually taking the initiative today and placing a labor service of the kind referred to at the disposal of the Baltimore & Ohio Railroad, the railroad enjoying such decided success in its operations, indicates that our railroad unions are ready and able to respond and will gladly assume their share of responsibility if encouraged to do so.

The Farmers Are Entitled To a Square Deal

By Samuel O. Dunn
Editor of the *Railway Age*

WE HEAR a great deal about the farmer being entitled to a square deal from the railroads. No one denies it. But he is entitled to a square deal from many other sources in which he is not getting it. He is entitled to a square deal from labor, from the railway employees who receive in wages almost one-half of the amount the farmers pay for freight charges; from manufacturers and merchants whose goods he buys; from the laborer whose wages these manufacturers and merchants pay. The farmer is entitled to a square deal from those who lend him money, and from those who levy taxes upon him. Obviously, the farmers might be wholly ruined while getting a perfectly square deal from the railroads, if at the same time the opposite of a square deal were given them by other persons or industries.

Why is it that so many persons advocate lower freight rates as a measure of relief for the farmer, and so few think of urging reductions of prices, of taxes, and of the wages paid organized labor, as measures of relief? Where is the man in public life who has yet had the courage to tell the farmers who are losing money, that the bulk of it is going in the form of high wages to the organized labor, employed not only in our railroads but in all our other great industries? The average hourly wage of railway employees today is 118 per cent higher than it was seven years ago. The increases in the wages of coal miners and employees of some other large industries are still greater. No general reduction of railway wages can be made while wages remain so high in other industries with which the railways must compete for labor.

The total value of farms and farm properties in the United States had increased from 20 to 77 billion dollars between 1900 and 1920. Part of this increase was due to war time inflation and has since been lost. But it is only stating something which everyone knows to be true to say that almost throughout the history of our railways the prosperity and wealth of our farming population has been constantly in-

*Abstracted from an address before the International Farm Congress at Kansas City, Mo., on October 10.

creasing. If the railways should be criticised because at times their rates on farm products have been too high, or the service supplied by them inadequate, they should, at the same time, receive credit for the fact, which cannot be successfully disputed, that most of the time railway rates and service have been highly favorable to the welfare of agriculture.

In the middle of 1920 the average price of farm products was 200 per cent higher than in 1906—three times as high as 14 years previously. The advance in rates granted in 1920 made the average freight rate of the railways only 75 per cent more than it was in 1906. In short, the average price of farm products had increased almost three times as much as the average freight rate of the railways ever did increase. I think every fair-minded farmer will admit that some consideration should be given to the fact that the farmers enjoyed increases in the prices of their products for 12 years before any general advance in rates was given the railways, and that when the peak of both rates and prices was reached the average freight rate had advanced only 75 per cent, while the average price of farm products had gone up 200 per cent. Obviously, if railway rates had been advanced with farm prices the question of how much the rates should be reduced, now that farm prices have declined, would present a very different aspect.

An unprecedented decline of prices came in 1920, the severest cut being in farm products. Since then railway rates also have been reduced an average in the entire country of 13 per cent, and in western territory 16 per cent. The reduction on coarse grain has been 21 per cent. Since 1921 the prices of most farm products have increased, so that some classes of farmers are now receiving relatively high prices. Cotton and tobacco sell for approximately twice as much as before the war. Lambs were $7.10 in September, 1923.

Today the *average* is $13. Wool has more than doubled in price in 10 years. The prices of these and some other commodities are, in fact, much higher compared with pre-war prices than the railways' charges for carrying them. Unfortunately, however, the prices of some other farm products—and this is especially true of wheat—are relatively low, compared with other farm commodities, and in consequence there is distress and discontent among the farming population in some parts of the country, but especially in the West. Obviously, if lower rates on certain farm products would affect the farmers, it would also affect the railways. No one will deny farmers are entitled to a square deal from the railroads. It is equally true, however, that the railroads are entitled to a square deal from the farmers. No rate can be fair to one which is not fair to both.

New England Consolidation Hearings Concluded

THE HEARINGS before Commissioners Hall, Eastman and Cox relative to the disposition of the New England roads in the railway consolidation plan were resumed at Boston on October 3, and lasted until the afternoon of October 5. Nathan L. Amster, chairman of the executive committee of the Chicago, Rock Island & Pacific, John E. Oldham, of Merrill, Oldham & Company, and finally James J. Storrow, who was the chairman of the joint New England railroad committee which reported to the New England governors in favor of a New England plan of consolidation, were among those who appeared to present their views.

When the hearings began on Wednesday morning, the stand was resumed by Charles A. Andrews, representing the Associated Industries of Massachusetts, who continued his testimony as to the findings of that association in favor of trunk line affiliation. Mr. Andrews' argument was presented at the hearings the preceding week and was abstracted in last week's issue of the *Railway Age*. On cross-examination, Mr. Andrews expressed it as his opinion that, "By the time the trunk lines had invested some millions in New England they would begin to realize that they must consider the property of their clients and act accordingly." Any other policy would be "bad business," he said, maintaining that New England would have nothing to fear from trunk line control. He pointed out also that certain disadvantages would result from the establishment of a boundary at the Hudson River as would result from the New England regional grouping because, he said, New England's economic interests take it far beyond that point. It was his view that one of the important advantages of consolidation with trunk lines would be that New England would then be linked to the points of the country distant from New England.

Professor George F. Swain, formerly chairman of the Boston Transit Commission, and a leading railroad engineer, submitted, at the afternoon session on Wednesday, the report prepared some months ago of the Affiliated Technical Societies of Boston, which advocated trunk line consolidation. He said that the nine societies affiliated in the organization favored the trunk line plan because of the present weak financial condition of the New Haven and the Boston & Maine, and the greater operating costs which exist in New England as compared with other eastern roads. Upon cross-examination he admitted that no shippers had been consulted when the societies were collecting their data, and that the committee had not made any first hand investigation of the relative efficiency of the New England roads.

On Thursday, William F. Chandler, head of the transportation department of the Boston Chamber of Commerce was cross-examined on his agreement made at one of the sessions the preceding week favoring the New England plan of consolidation. He emphasized, particularly, the necessity of keeping the New England gateways open for traffic and expressed the view that there was no certainty that these gateways would remain open in case of trunk line consolidation. Following Mr. Chandler's cross-examination, Clarence E. Carr, of the New Hampshire section of the joint railroad committee, testified. The New Hampshire members of the committee dissented from the majority findings of the Storrow report. Mr. Carr said that while the New England people may want a New England system, it could not be brought about because of the financial weakness of the New England lines.

Nathan L. Amster Testifies

Nathan L. Amster, chairman of the executive committee of the Chicago, Rock Island & Pacific, and who has a large interest in New Haven securities, appeared at the hearings on his own behalf. He expressed the view that the Storrow report offered a plan that was obsolete and unnecessary. "In my opinion," he said, "the two major New England railroads do not need rehabilitation, at least the kind of rehabilitation pointed at in the report of the joint New England railroad committee. If the New Haven should get proper compensation for carrying the mails and remunerative rates for other services, it would be able to earn at least enough to cover bond interest. I don't think the situation calls for the New Haven bond holders to scale down their bonds and take a preferred stock. I don't think the remedy offered by the committee will bring about the results hoped for."

Oldham Offers His Plan for Joint Trunk Line Control

John E. Oldham, who has given considerable study to the railroad consolidation problem, again offered his plan for a consolidation of the New England roads with the ownership of the combined system distributed among the roads in the eastern district in proportion as they benefit by rates higher than would be made were New England excluded as

a part of the eastern rate making district. His argument follows in part:

I would call attention to the fact that two systems—the New York Central and the Pennsylvania—with their affiliated companies already handle over 50 per cent of the tonnage in the Eastern district, and if the rates produce income as a whole which covers the requirements of all roads in the district, including the New England roads, these two systems would receive over 50 per cent of the benefit derived from the increase in rates to which reference has been made. This plan, therefore, would contemplate that the New York Central and the Pennsylvania systems together participate in the ownership of the New England roads to the extent of approximately 50 per cent of such ownership. While it may be out of place to express any opinion at this time as to the grouping of the New England roads outside New England, it may be noted that there is no other large system today in the Eastern district which could possibly form the basis of a system similar in character to the New York Central and the Pennsylvania, which does not reach one or more of the New England gateways. It seems probable that the remaining roads will necessarily be grouped with two or possibly three additional systems in an attempt to construct systems which can compete on equal terms with the New York Central and the Pennsylvania, and this plan would contemplate that these systems also should participate in the ownership of the New England roads to an extent similar to that of the New York Central and the Pennsylvania.

Under such conditions every system in the eastern district, west of the Hudson River would be available for New England shippers and every gateway would be open for the use of all without discrimination. Each outside road would share in New England business in accordance with the excellence of the service it offered. There would be a maximum of competition for the business of New England. Whatever difference of opinion there may be as to the openness of gateways or the power of the commission to assure diversity of routes in case one trunk line owned one New England road and another trunk line owned by another New England road there can be no dissent from the conclusion that under such a plan of joint ownership no such difficulty would be possible.

That outside owners of the New England roads would be negligent of the needs and desires of the New England public under conditions of such a plan of consolidation cannot be reasonably expected. If, however, there is fear that New England interests would not be properly protected it is in the power of the commission when such consolidations are under consideration to prescribe that New England shall participate in the management to whatever extent may be necessary, for the commission is authorized, in giving its consent to any consolidations, to stipulate any terms and conditions which it may deem necessary to protect the public interest. The combined resources and the credit of the owning roads would be ample to secure such capital as may be needed to provide facilities sufficient for the needs of New England.

I see no likelihood that an all-New England system, separately owned and operated, can so maintain itself that it can merit the confidence of investors and justify the further investment of savings and trust funds in its securities. The suggestion of State aid to bolster up the credit of a proposed New England system is evidence that its proponents recognize its financial weaknesses.

Mr. Oldham expressed his inability to agree with the conclusions in the Storrow report on the ground that a self-contained New England railroad could not be self-sustaining. On this point he said:

Let me say in closing that I am not averse to an all-New England railroad system operated, maintained and owned in New England when evidence is presented which will stand careful analysis that the handicaps of higher operating costs can be removed and such a system can be made self-sustaining under rates which are adequate for the other roads as a whole in Eastern territory. It is a matter of indifference whether this result is accomplished by more efficient management or the lowering of operating costs or by finding some way other than trunk line affiliation by which the New England roads can receive the income derived from rates so obviously made for their benefit. I do not consider that this has been done in the Storrow report.

Mr. Oldham was cross-examined at some length by H. T. Newcomb, general solicitor of the Delaware & Hudson, particularly with reference to figures put in evidence in the first week of the hearings to show that the New England roads labored under a permanent disability in operating costs of about ten cents on a dollar of revenue as compared with various other eastern roads. He was questioned by Commissioner Eastman and explained that under his plan the New England roads would first be joined in a combination and then the stock of this combined company would be exchanged for the stock of the trunk line owners, the trunk line owners to guarantee in some way the New England company against deficits. Mr. Eastman asked if the trunk lines would come in if the New England lines were not first rehabilitated. "I think," said Mr. Oldham, "that New England roads would first have to be brought together on the basis of their property value and earning capacity somewhat regardless at first of the securities outstanding against them, and that there would then have to be an arrangement of securities to bring them into some sort of a relationship to the property values and earning capacity."

New England's Supposed Operating Disabilities

Josiah F. Hill of the banking firm of Lee, Higginson & Co., of which company Mr. Storrow is the head, appeared on Friday and took issue with Mr. Oldham's statement that the New England railroads are handicapped in their operating costs to the extent of ten cents per dollar of revenue as compared with the various other eastern roads. He said further that even if Mr. Oldham's theory were correct, he would not admit that a trunk line control was necessary or even desirable.

With reference to Mr. Oldham's statement as to comparative operating costs, he said that the Storrow committee experts analyzed the operating results of the New England railroads as compared with those of 30 roads west of the Hudson river in the eastern district. He said that in the three-year period, 1914 to 1917, the cost of operation of the proposed New England system was 4.7 cents higher per dollar of revenue than the New York Central; 1.3 cents lower than the Pennsylvania; 1.5 cents higher than the Baltimore & Ohio, and 2.7 cents higher than the average of all 40 lines west of the Hudson. In 1922, the cost of operation of all these roads had substantially increased and the relationships showed that the costs in New England were 6.6 cents higher than the New York Central; 1.7 cents higher than the Pennsylvania; 2.2 cents higher than the Baltimore & Ohio and 3.1 cents higher than the average of all 30 lines.

Mr. Storrow Concludes Hearings

James J. Storrow appeared as a witness at the closing session. He pointed out that the findings of the Associated Industries of Massachusetts in favor of the trunk line plan of consolidation did not represent the majority view because only 19 members of its executive committee were in favor of the trunk line plan, although the committee had 42 members. With reference to the Storrow plan of rehabilitation, he spoke as follows:

When the New Haven Railroad rehabilitation commences, every detail will be combed over, improved and changed. What we have set forth is merely the first draft of the plan. There are no super-difficulties about this reorganization. It is just a plain, garden variety of plan, possibly with a few headaches in it, but men will come forward who will command the confidence of the investors.

The business of railroading in New England is not such a hopeless enterprise as some of the sobbers seem to think. We have certain unquestioned disadvantages, the principal ones being:

1.—Greater cost of coal.

2.—Lower density of freight traffic.

3.—Greater cost of station, terminal and switching expense in proportion to revenue.

4.—Slower movement of freight cars due to terminal delays at numerous junction points, and shorter haul.

But we also have some notable advantages. The much higher average class of freight carried, resulting in a much greater gross revenue per mile by freight train in spite of smaller train loads, and also per freight car mile.

For example, the average gross freight revenue per ton mile for the roads comprising the proposed New England system is 1.904 cents, compared with 1.05 cents for the eastern district outside of New England—an enormous difference and all in favor of our New England roads.

This is not due to a higher schedule of freight rates, but to a higher average class of merchandise which carries on all roads a higher rate.

Change in Engine Districts Improves Operation

New Arrangement Meets Traffic Requirements and Gives Advantages of Longer Freight Runs

A RE-ARRANGEMENT of engine districts, whereby the number of districts is reduced and their length increased, is contrary to the prevailing tendencies, yet this is exactly what has been done by the Great Northern on the 259 miles of its main line between Hillyard, Wash., and Skykomish, where, through the establishment of a new terminal at Wenatchee, two engine districts have been provided in a distance formerly served by three. It is interesting to note in this connection that this step was undertaken in spite

The Facilities Include Tanks for the Delivery and Storage of Fuel Oil

of the fact that one of the new districts thus created has a length of 176 miles.

This change was made in accordance with a definite project for increasing the length of engine districts on the Great Northern for the purpose of securing greater economy of operation and on which definite progress has been made over a measurable portion of the system. It was also undertaken as a means of improving the facilities for the handling of the growing fruit development in the Columbia river basin, of which by far the major portion is apples. Much of this development is directly tributary to the town of Wenatchee, on the west bank of the Columbia. The rest of it originates along the Mansfield and Oroville branches of the Great Northern which extend northward from the main line on the east and west sides of the river, respectively. The total area devoted to fruit growing in this territory is approximately 30,000 acres of which about one-half is in the immediate vicinity of Wenatchee. It is responsible for the average movement of about 15,000 carloads of fruit annually, an amount of business which has resulted in establishing Wenatchee as an important concentrating and forwarding fruit center. This business is handled by some 17 fruit houses, controlling a cold storage capacity of about 670 carloads, and uninsulated storage to the amount of 4,622 carloads.

The relation of storage capacity to production indicated by these figures points to the need of very prompt movement of the fruit during the packing season, which for apples begins in October and ends about January 1. The movement of soft fruit—peaches, cherries, apricots and pears—starts in July, but this is light compared to the apple business.

Decision to Rearrange Districts

Previous to the establishment of the Wenatchee terminal, the arrangement of the engine districts between Hillyard and Skykomish was as follows: Hillyard to Wilson Creek, 104 miles, ruling grade, 1.0 per cent west, 0.08 per cent east; Wilson Creek to Leavenworth, 98 miles, ruling grade 1.0 per cent each way; and Leavenworth to Skykomish, 57 miles crossing the Cascade range with 2.2 per cent grades on each side of the summit. Wenatchee is 23 miles east of Leavenworth, and the increasing amount of business originating there, as well as that on the two branch lines which join the main line near Wenatchee, interfered seriously with the economical handling of trains in the engine district between Wilson Creek and Leavenworth since the consist of a large part of the freight trains in each direction was materially changed in setting out or picking up cars at Wenatchee.

A study of this problem led to the conclusion that the location of the engine terminal at Wenatchee, the point of origin and destination for a considerable car movement and which incidentally reduced the number of engine districts, would outweigh the advantages of the old arrangement whereby the ends of two engine districts was located at the foot

A Birdseye View of Appleyard with Wenatchee in the Right Background

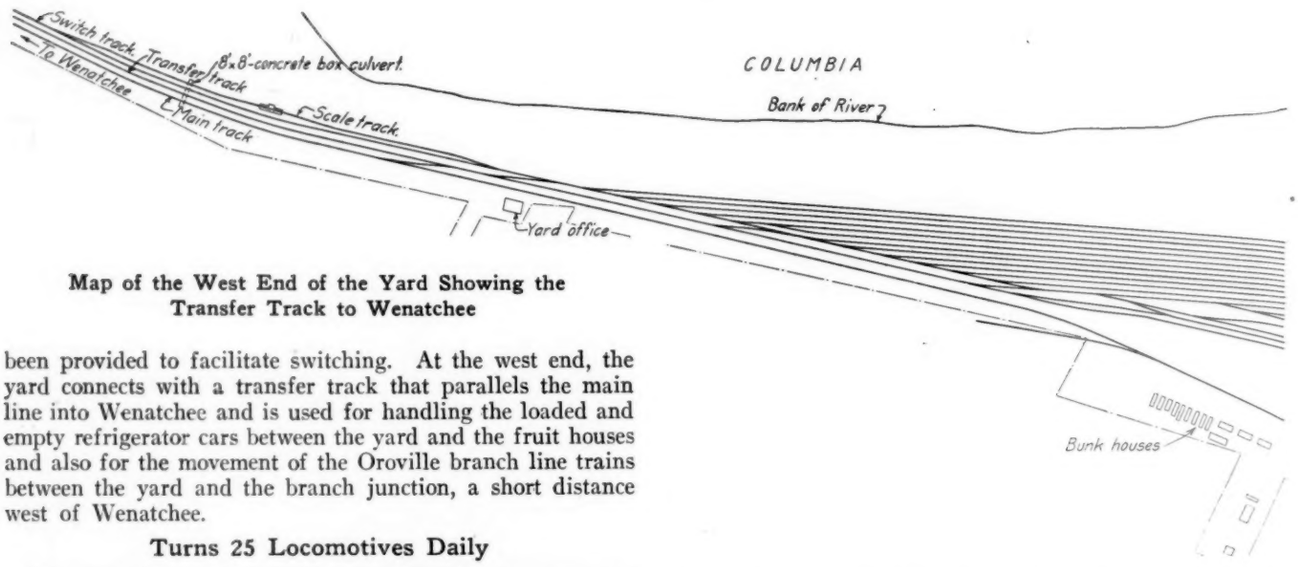
of the mountain grade. Experience, since this plan has been put into effect, has demonstrated the wisdom of this conclusion. The movement of the fruit is almost entirely eastward and the new arrangement greatly facilitates the making up of solid fruit trains at that point, together with the breaking up of westbound trains for the set-out of empty refrigerator cars.

The existing track layout serving the fruit houses at Wenatchee did not lend itself readily to the necessary expansion for a terminal yard. Consequently, it was necessary to construct a new terminal at a site some two miles east of the town on a generally flat area bordering the Columbia river. This terminal is designated as Appleyard. Preparation of the site entailed 275,000 cu. yd. of grading in glacial drift

containing a considerable amount of boulders that make it difficult to handle. The work was planned so as to provide a good balance of cut and fill. The building of the yard required a minor change in the location of the main line of the Great Northern and the relocation of a highway paralleling it. It also required the construction of a triple 5-ft. by 8-ft. culvert across the yard.

Yard Designed for Future Extension

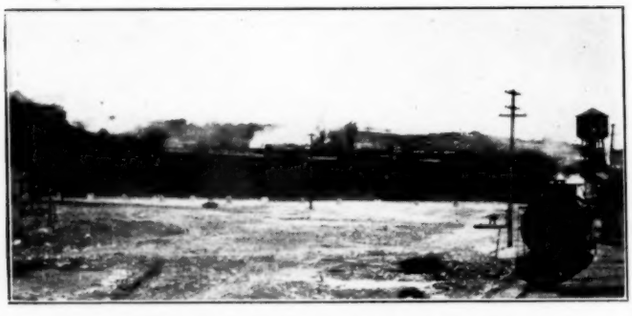
The classification yard, which is on the river side, consists of a simple grid of tracks, 3,000 to 4,000 ft. long, but with ample space for their extension whenever necessary. There is no yard lead at the east end but a 1,000 ft. tail track has been provided to facilitate switching. At the west end, the yard connects with a transfer track that parallels the main line into Wenatchee and is used for handling the loaded and empty refrigerator cars between the yard and the fruit houses and also for the movement of the Oroville branch line trains between the yard and the branch junction, a short distance west of Wenatchee.



Map of the West End of the Yard Showing the Transfer Track to Wenatchee

Turns 25 Locomotives Daily

The operation of Appleyard, together with the passenger train movements, requires the turning of about 25 locomotives daily. These include Pacific and 10-wheel type locomotives in passenger service, Mikado type in main line freight service east of Wenatchee and Mallets in main line service west over the Cascades, consolidations for the branch line and local freight service and eight-wheel switch engines for the yard service at Appleyard and Wenatchee and transfer service between the two. The Mikados in service between Appleyard and Spokane are rated at 2,000 tons (45 cars) eastbound for all classes of freight, no distinction being made between time freight and dead freight. The Mallet locomotives are rated in two classes; two-engine trains, 2,250 tons and one-engine trains, 1,550 tons. Both the one-engine and the two-engine trains receive helper service from an additional Mallet between Leavenworth and Cascade tunnel. Westbound symbol trains are rated at 100 tons less and stock trains 200 tons less.



The Roundhouse Is of Frame Construction

It requires one or two switch crews to do the work at Wenatchee, picking up and spotting the refrigerator cars at from 15 to 17 fruit houses with a total of 75 to 150 spots per day, while a transfer crew is employed in moving the refrigerator cars to Appleyard and in moving back the empties. The regular arrangement is to have the fruit houses stop the loading of cars at six p. m. but during the car shortage last fall the shippers were allowed to load as long as they had cars.

The fruit trains are classified at Appleyard only to the extent of putting on the rear of the train cars destined for Havre and west and for Billings. Whenever the fruit cars are insufficient to make an entire train the tonnage is filled out with dead freight which is often replaced at Spokane by fruit cars originating in that vicinity. The handling of fruit trains over the 176-mile engine district east of Appleyard and also over the 80-mile district to the west with its heavy mountain grades and pusher operation within the 16-hr. limit imposes no mean operating problem but this has been solved by reducing the terminal delay at the departure to an absolute minimum, or an average of approximately 15 min. This has been effected by having the train made up complete before calling the road crews. An engine dispatcher, who is a regular engineman rated according to the classes of power he handles, places the engine on the train with the aid of the hostler. The train is inspected, the air tested and all preparations made without any attention from the road crews, whose calling has been timed so that this work will be all complete before they report. As a further precaution the leaving time of the train given the crews when called is not determined until consultation with the dispatcher insures the yardmaster that the train may leave the yard at the time set. The road crews therefore, have nothing to do but to take water and leave. This practice is followed for all main line trains except locals and has been very successful in keeping down the number of trains tied up on the road at the expiration of 16 hours.

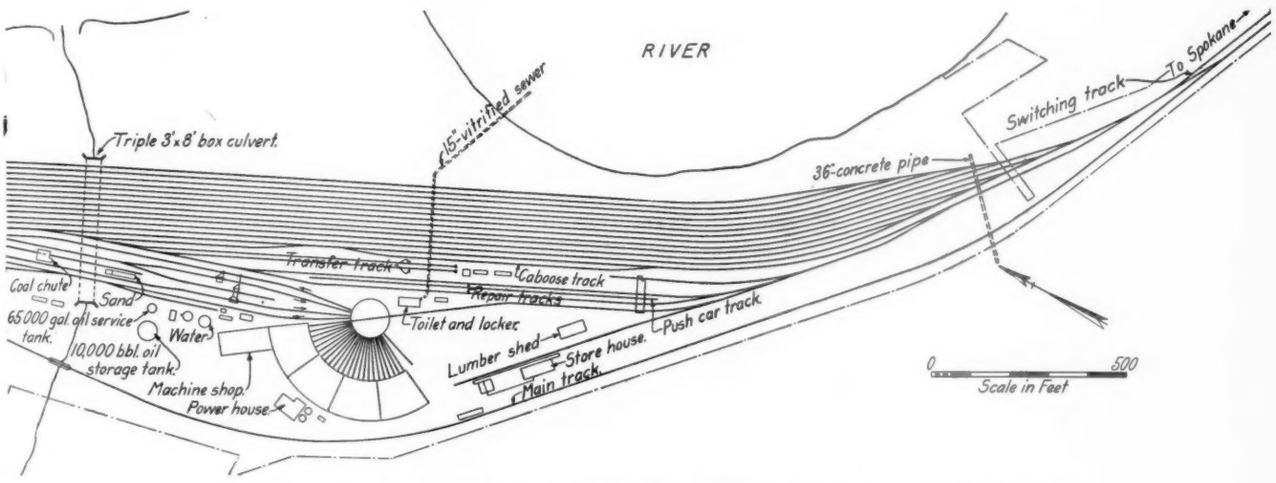
Facilities Were Transferred to Appleyard from Other Points

The engine terminal at Appleyard is notable for the fact that nearly all parts of it are composed of materials recovered in the dismantling of similar facilities elsewhere, particularly from the abandoned terminal at Bowdoin, Mont. Material obtained from that point included the timber frame, brick and heating system for the roundhouse and machine shop; a 100-ft. turntable; brick, boilers, pump, piping, etc., for the power house; the timber frame of the coaling station,

sand bin and sand tower; material and equipment for the toilet and locker rooms; the car repair building complete; the store and oil house; the track scale house, and lighting fixtures and equipment for the water supply. In addition to the above, two Robertson ash conveyors were transferred from Interbay (Seattle) while the fuel oil facilities were moved from Goldbar, Leavenworth, and Wenatchee.

The engine facilities include a 24-stall roundhouse entirely of timber construction except three brick fire walls. The roundhouse is served by a 100-ft. turntable of the through-truss type and is adjoined at the one side by a 130-ft. by 60-ft. machine shop. Communication between the roundhouse and the machine shop is afforded by the extension of one of the stall tracks into the shop building, the roundhouse stall being one equipped with a drop pit. The shop building is equipped with a track pit 68 ft. long served by two drop pits frame construction equipped with double elevating buckets supplied by the Bay City Foundry and Machine Company. The track hopper is directly under the building thus offering some measure of protection from the weather. Fuel oil facilities include a large storage tank and elevated delivery tank. Since the completion of the terminal arrangements have been made for the use of fuel oil in the district east of Appleyard.

Auxiliary facilities include a storage house 84 ft. by 38 ft. with a platform 103 ft. by 38 ft. having a concrete basement under one end for oil storage. The power house is equipped with two 125-hp. locomotive type boilers with space for one additional and also houses a 10-in. by 16-in. by 10-in. compressor, a 16-in. by 9-in. by 12-in. fire pump, a 10-in. by 8½-in. by 12-in. refilling pump, and a 16-in. by 8½ in. by 12 in. washout pump.



Map of the Engine Terminal and the East Half of Trackage at Appleyard

of sufficient size to take a 74¼-in. wheel. The buildings are heated with Vento heaters. Water storage is supplied by a 100,000-gal. wooden tank supported on a high steel tower. The water supply comes from the river, which has a 60-ft. variation of water stage. To meet this condition a shaft was sunk well back of the river bank to a depth of 50 ft. below the ground level from the bottom of which two eight-inch suction lines extend to the river. The pumping unit is an electrically driven centrifugal pump with a delivery of 650 gal. per min. placed at the foot of the shaft.

Provide for Both Coal and Fuel Oil

At the time that the work on the terminal was authorized coal was used as fuel in the district east of Wenatchee and oil in the territory to the west. Accordingly provision was made for both coal and fuel oil facilities at the terminal. Coal service is provided by a 250-ton station of

The Turntable Was Moved from Bowdoin, Mont.

The engineering features of this terminal and the construction were carried on under the direction of the engineering department of the Great Northern. The work was under the general supervision of A. H. Hogeland, chief engineer, and under the direct charge of O. S. Bowen, assistant chief engineer, Seattle, Wash.

"P. & A. Photo"

Mr. and Mrs. Lloyd George and Their Daughter Miss Megan Lloyd George Leaving New York for Canada

New Car Loading Record

WASHINGTON, D. C.

ALL PREVIOUS RECORDS for the number of cars of revenue freight loaded in a week were broken again during the week ended September 29, with a total of 1,097,274 cars. This is an increase of nearly 5,000 over the previous high loading during the week of September 1 and also an increase of 119,483 cars as compared with the corresponding week of 1922, and of 192,443 as compared with 1921. Coal loading showed some gain over the previous week, due to the resumption of anthracite mining, but the largest increase was shown in the loading of miscellaneous freight. Grain loading showed a decrease of 1,029 cars as compared with the corresponding week of last year; all other classes of commodities showed increases. Miscellaneous loading amounted to 393,009 cars, an increase of 45,588 as compared with the corresponding week of the year 1922.

State Power to Order Expenditures Superseded

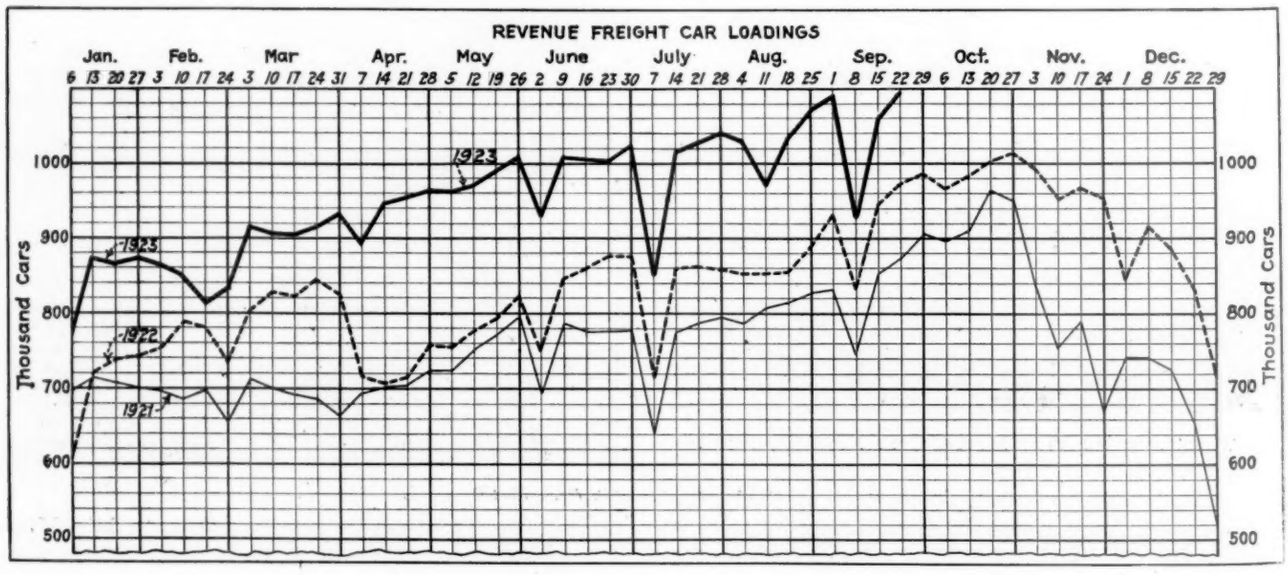
THE SUPREME COURT of South Carolina has recently rendered an unusually sweeping decision to the effect that the Transportation Act of 1920 has placed entire control over rates, properties, tracks, terminals and facilities of railroads engaged in interstate commerce under the jurisdiction of the Interstate Commerce Commission and that state railroad commissions no longer have authority to require railroads to make capital expenditures for improvements which will affect the ability of the roads to earn the percentage of return on their valuation prescribed by the federal commission. The court, however, has since granted a rehearing in the case, which involved an order of the South Carolina Railroad Commission, dated March 14, 1923, requiring the Southern to construct station sheds at Blackville, S. C.

The opinion is based not only on decisions of the Supreme

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, SEPTEMBER 29, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded 1923	Corresponding period 1922	Corresponding period 1921
Eastern	1923	9,275	3,714	54,939	3,499	5,994	5,319	68,464	105,440	257,644	.....	.....
	1922	7,541	3,738	55,445	1,658	5,876	3,828	64,153	94,662	.....	236,901	212,075
Allegheny	1923	2,807	2,893	55,469	6,096	3,640	11,867	51,950	89,163	223,885	.....	.....
	1922	3,108	3,729	56,343	4,599	3,127	9,361	50,336	78,637	.....	209,240	173,940
Pocahontas	1923	276	392	29,502	524	1,841	154	6,786	5,985	45,460	.....	.....
	1922	254	540	16,690	228	1,448	34	5,111	3,490	.....	27,795	34,762
Southern	1923	3,707	2,636	25,624	834	24,120	1,624	41,337	45,907	145,789	.....	.....
	1922	3,555	2,804	21,574	895	17,834	1,197	36,912	42,186	.....	126,957	131,932
Northwestern	1923	17,165	10,935	9,327	1,471	19,315	46,734	32,361	45,211	182,519	.....	.....
	1922	18,955	9,723	10,048	1,408	15,559	32,597	28,940	37,588	.....	154,818	138,470
Central Western	1923	13,161	16,912	20,222	316	12,009	2,932	36,539	66,602	168,693	.....	.....
	1922	14,032	15,599	20,482	521	8,432	2,415	34,540	62,275	.....	158,296	144,358
Southwestern	1923	4,505	4,142	5,887	196	8,572	542	15,739	33,701	73,284	.....	.....
	1922	4,480	3,666	7,230	144	5,726	563	13,392	28,583	.....	63,784	69,294
Total West. Dists.	1923	34,831	31,989	35,436	1,983	39,896	50,208	84,639	145,514	424,496	.....	.....
	1922	37,467	28,988	37,760	2,073	29,717	35,575	76,872	128,446	.....	376,898	352,122
Total all roads	1923	50,896	41,624	200,970	12,936	75,491	69,172	253,176	393,009	1,097,274	.....	.....
	1922	51,925	39,799	187,812	9,453	58,002	49,995	233,384	347,421	.....	977,791	.....
	1921	57,222	32,979	180,354	5,588	49,853	26,472	236,105	316,258	.....	.....	904,831
Increase compared	1922	.....	1,825	13,158	3,483	17,489	19,177	19,792	45,588	119,483	.....	.....
Decrease compared	1922	1,029	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	.....	8,645	20,616	7,348	25,638	42,700	17,071	76,751	192,443	.....	.....
Decrease compared	1921	6,326	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
September 29	1923	50,896	41,624	200,970	12,936	75,491	69,172	253,176	393,009	1,097,274	977,791	904,831
September 22	1923	48,906	41,751	182,524	13,339	73,629	75,527	250,369	374,391	1,060,436	961,138	873,641
September 15	1923	54,462	39,785	171,830	13,704	74,760	76,661	249,262	380,116	1,060,580	937,221	852,552
September 8	1923	46,782	35,716	152,996	13,543	66,256	71,694	217,670	324,201	928,858	823,247	749,552
September 1	1923	54,604	39,201	206,610	13,970	77,279	78,193	246,984	375,726	1,092,567	923,806	831,288



Court of the United States construing the Transportation Act but also upon decisions of the highest courts of New York and California, the latter of which has been appealed to but not yet passed upon by the Supreme Court. The New York and California decisions were less sweeping than that in the South Carolina case, however, as they involved the construction of interchange tracks and a union terminal depot, respectively, and were based upon the provision of the Transportation Act which requires a carrier to obtain authority from the Interstate Commerce Commission for any extension of its line, whereas the South Carolina court not only deals with the station sheds as extensions for which a certificate must be obtained from the Interstate Commerce Commission, but goes farther and finds that a requirement by state authority for the expenditure of capital affects not only the return to be earned by the roads as a whole but also the sum which the government may "recapture" and the valuation upon which the returns are to be calculated. The court, therefore, concludes that the transportation act has limited the power of the states over interstate commerce to an "exceedingly circumscribed sphere" and that as "no man can serve two masters" such control as they may exercise "must be exercised in a manner that does not project the will of the particular state into other states of the union."

The question came before the court because the railway company having failed to comply with the order, the railroad commission filed its petition for a mandamus to compel compliance, and obtained from the chief justice an order requiring the Southern Railway to show cause why the mandamus prayed for should not be issued. The railway company made return to the order of the chief justice, admitting substantially the facts alleged in the petition, and specifically urging the following objections to the order of the railroad commission:

"That the lines of the Southern Railway Company here in question compose a part of the Southern Railway System, which is an interstate railroad, and that the lines here in question are used for interstate travel and freight from the city of Charleston to the city of Augusta and other points beyond the said cities of Charleston and Augusta, and a line extending from the state of Georgia to Columbia, Charlotte, Spartanburg, Asheville, Greenville, Atlanta and other points, from which interstate traffic and transportation revenues are largely composed, and that by reason of the laws of the federal government with regard thereto, the Railroad Commission of South Carolina is without jurisdiction to order improvements of the nature and kind provided in the order here in question, and the same is therefore null and void;" and that "this court is without jurisdiction to render an order herein requiring compliance with the order of the railroad commission, and the same constitutes taking of property without due process of law, in violation of article five of the Constitution of the United States."

An abstract of the court's decision, directing that the petition be dismissed, is as follows:

If it were not for the act of Congress, referred to as the "Transportation Act of 1920," there would be ample authority in the decisions of this court to sustain the commission's order. . . . The Transportation Act of 1920 effected a radical departure, and introduced into federal legislation a new railroad policy. It has placed the entire control over rates, properties, tracks, terminals and facilities of railroads engaged in interstate commerce, in and under the jurisdiction of the Interstate Commerce Commission.

Subdivision 18 of Section 1 of the I. C. Act, as amended by the Transportation Act of 1920, provides:

"After ninety days after this paragraph takes effect no carrier by railroad subject to this act shall undertake the extension of its line of railroad . . . until there shall have first been obtained from the commission a certificate that the present or future public convenience and necessity require . . . the construction . . . of such additional . . . line of railroad."

The term "railroad" as used in the act of 1920 is defined as including "all the road in use by any common carrier operating a railroad, whether owned or operated under a contract, agreement, or lease, and also all switches, spurs, tracks, terminals, and terminal facilities of every kind used or necessary in the transportation of the persons or property designated herein, including all freight depots, yards, and grounds, used or necessary in the transportation or delivery of any such property."

In Atchison etc. R. Co. v. R. R. Commission (Cal.) 211 Pac. 460 it is said:

"In the matter of extension of railroad facilities and in the abandonment of other railroad facilities, including terminals, not only is the commission empowered to act upon the subject, but Congress has expressly prohibited the railroad companies from acting without the consent of the I. C. Commission." Citing subdivision 18 above quoted.

Not perhaps directly applicable to the matter in hand, but as indicating a definite purpose that the I. C. Commission should have supervision of all facilities of carriers Subdivision 3 of Section 3 of the Interstate Commerce Act, as amended by the Transportation Act of 1920 provides:

"All carriers, engaged in the transportation of passengers or property, subject to the provisions of this act, shall according to their respective powers, afford all reasonable, proper and equal facilities for the interchange of traffic between their respective lines, and for the receiving, forwarding, and delivering of passengers and property to and from their several lines and those connecting therewith, and shall not discriminate in their rates, fares and charges between such connecting lines, or unduly prejudice any such connecting line in the distribution of traffic that is not specifically routed by the shipper."

If therefore Congress has committed to the I. C. Commission the supervision, control and direction of railroad facilities of every nature, the field has been occupied, to the exclusion of state regulation.

Whenever the interstate and intrastate transactions of carriers are so related that the government of one involves the control of the other, it is Congress and not the state, that is entitled to prescribe the first and dominant rule, for otherwise Congress would be denied the exercise of its constitutional authority, and the state and not the nation, would be supreme in the national field.

The question which arose in the case of People ex rel New York etc. R. Co. v. Public Service Commission, 235 N. Y. 113, was whether or not the Public Service Commission of New York had the power to make an order directing two railroad companies engaged in interstate and intrastate commerce within the state, to construct a switch or track connecting their lines and install other tracks and facilities so as to furnish adequate and convenient interchange of freight between said railroads. The court held that the state commission had no jurisdiction to make such order in view of the Transportation Act of 1920, amending the Interstate Commerce Act which preempted the legislative field in favor of the I. C. Commission.

In Atchison etc. R. Co. v. R. R. Comm. (Cal.) 211 Pac. 460, the main question involved and discussed was whether or not the railroad commission of California had the power to order three separate railroad companies, whose lines entered Los Angeles, each of which was engaged in both classes of commerce, to establish a union terminal depot within a certain defined area. The court in an exceedingly elaborate and able opinion, unanimously held that in view of the Transportation Act of 1920, the power did not exist. It was held that in the matter of the extension of railroad facilities, not only is the I. C. Commission empowered to act on the subject, but that Congress has expressly prohibited the railroad companies from acting without the consent of the I. C. Commission under penalty.

Another consideration is conclusive of the purpose of the act to control the matter of non-productive, additional facilities and terminals, and having pre-empted this field, all regulation by the states is interdicted. This matter is not only subjected to the control of the I. C. Commission, but it is so inter-related with the purpose of the act in supervising transportation facilities and in fixing rates, that interference by the states therewith necessarily affects interstate commerce.

Section 15a of the act makes it the duty of the I. C. Commission, in the exercise of its rate-making authority, to prescribe such rates as will give the carrier a fair return upon the aggregate value of railroad properties used in the service of transportation.

The act specifically provides that in "making such determination," that is, what shall constitute a "fair return" of the aggregate property value of the carrier, the I. C. Commission shall give due consideration to the transportation needs of the country and the *necessity of enlarging such facilities* in order to provide adequate transportation; they shall determine whether or not the management of the carrier has been "honest, efficient and economical"; and whether or not the expenditures for maintenance of way, structures and equipment have been reasonable.

We may conceive an instance of a carrier operating upon a negligible net operating income and making application to the I. C. Commission for an increase of rates; its statement shows the value of its property to be so much, and its net operating income to be below 6 per cent of the aggregate value of its property. If such statement be accepted as true, and it appears

that the management has been honest, efficient and economical, and the expenditures for maintenance of way, structures and equipment, reasonable, the I. C. Commission will be justified in allowing the increase of rates sufficient to insure the "fair return." But of all of these matters the I. C. Commission must be satisfied, and it is their duty to determine them. They are no more obligated to accept the dictum of a state legislature that certain additions, betterments or equipment are reasonable, than that the management has been honest, efficient and economical, or that the property is of a certain value.

Under the accounting system prescribed by the I. C. Commission, as is specifically stated in subdivision 3 of section 15a, improvements, betterments and equipment are chargeable to capital account. Many matters coming within this classification apparently, present a debatable question whether they should be charged to capital account or to operating expenses. It is manifestly to the interest of the carrier that they be charged to operating expenses, and thus reduce to a minimum the "net operating income," which is sought to be swelled by the requested increase of rates. The I. C. Commission may rule that they are not reasonable, although ordered by a state legislature, and therefore not entitled to enter into the property value, the basis of the proposed increase, and that they are not operating expenses; so that the carrier gets no credit whatever either in the capital account or operating expenses for the large outlay. The reasonableness of the proposed improvements being a matter for the determination of the I. C. Commission, the state's action is necessarily interdicted. Under the section of the South Carolina code claimed by the petitioners as their authority for ordering the improvements, the matter of repairs, enlargement or improvements in stations or station houses, modifications of rates, passenger and freight, or changes in the mode of operating the railroad and conducting its business, are committed absolutely to the judgment of the railroad commission as to what they conceive to be reasonable and expedient in order to promote the security, convenience and accommodation of the public. Under it they could order new and elaborate station houses at every point in the state; the abolition of every grade crossing, and any other improvement, betterment or additional equipment that might be suggested, without regard to the condition of the carrier, or of the effect upon its ability to provide adequate transportation after such expenditures may have been made. "No man can serve two masters."

Another consideration: Subdivisions 5 and 6 of Section 15a provide for what is called the "recapture" feature of the act; if any carrier shall receive for any year, a net railway operating income in excess of 6 per cent of the value of the property held and used by it in the service of transportation, one-half of such excess shall be placed by the carrier in a reserve fund established and maintained by the carrier, and the other half shall be paid to the I. C. Commission for the purpose of establishing a general railroad contingent fund; the reserve fund maintained by the carrier may be drawn upon for the purpose of paying dividends, interest on stock, bonds or other securities and rent on leased lines, to a certain extent specified; the general railroad contingent fund, in the hands of the I. C. Commission, is constituted a revolving fund, to be used in the furtherance of the public interest in railway transportation, by making loans to carriers to meet expenditures for capital account, by refunding securities issued for capital account, or by purchasing equipment and facilities and leasing same to carriers, under regulations detailed in the act.

It will be borne in mind that under the accounting regulations of the I. C. Commission, there is a definite limit in charging expenditure to operating expenses. Expenditures for additions and betterments must be charged to capital account—they cannot be charged to operating expenses; and they cannot be charged to capital account without the sanction of their reasonableness and public necessity by the I. C. Commission. It follows that if the expenditure should not be approved by the I. C. Commission as an item in the capital account, but should be allowed as an item in operating expenses, the requirement by the state of such non-productive additions and betterments will in effect reduce the carrier's approach under existing rates, a net railway operating income equivalent to a fair return on the value of the property, reducing also the possibility of excess earnings divisible with the government.

The Interstate Commerce Commission establishes rate groups, embracing in each group several states and several carriers. With respect to all of the railroads operating within that particular group there is determined an aggregate fair value of carrier property engaged in that group in the service of transportation. The percentage of return constituting a fair return on the value of the property is already stated. The commission accordingly authorized a schedule of rates sufficient at least in theory to provide the proper percentage of return on such aggregate value. From gross revenues operating expenses, taxes and joint facility rentals are deducted. The resulting figure, designated "net railway operating income," is the item considered in determining what percentage of return has in fact been realized and whether there are any excess earnings—and if so how much to be recaptured. Expenditures for additions and betterments are charged to capital account, increasing for the particular carrier the value of the property with relation to which the percentage of return is measured. But not only that: the added value attending the improvement thus charged to capital account increases the aggregate value of all carrier property engaged in the service of transportation in that entire rate group, necessitating ultimately a readjustment that the prescribed percentage of return may be realized on the new and increased aggregate value of the property. The direct and unescapable result of that is, that all the other states and communities of that rate group bear an uncompensated portion of the burden created by the unrestricted demands of a particular locality that its own desire for public improvements be met; and the burden is imposed on interstate commerce in the same sense that a discriminatory intrastate rate unlawfully burdens interstate traffic.

We quote from the respondent's argument the following very clear statement:

"The X Y. Z. Railroad operates almost wholly within the state of Virginia. If that carrier were, through state authorities required to and did abolish every grade crossing and improve every depot on its line of road between Alexandria and Richmond, the total expenditures would amount to many millions of dollars. By just the total amount of those expenditures would there be increased the property value on which it is entitled to a fair return under existing rates, reducing thereby the actual percentage of return realized. There would also be an increase in the aggregate value of the carrier property in that rate group and a necessary readjustment of rate for the group that the carrier might realize the return recognized as a fair return. Thus the burden of these improvements is imposed upon all other communities and states of that rate group, many of them unserved and untouched by the particular carrier;—imposed, too, upon the government itself, for if by the state authorities the entire income is expended the government is deprived of any participation in the earnings exceeding 6 percentum, there would be none.

"Let us suppose the case of a carrier which runs through fourteen states who has pending at this time insistent demands from state commissions, municipalities and state legislatures of $19,033,000 for the building and erection of non-revenue producing additions and betterments; the making of every one of those would add nothing to the revenue producing power of the plant, but would increase the capital value of the system by that amount, reduce proportionately the percentage of return, increase the aggregate value of carrier property within the particular rate group and necessitate ultimately a readjustment of rates that the prescribed return may be realized on the new and increased value of the property. The burden will be distributed to other communities in the same rate group but unserved by such carrier and unbenefited by the improvements. Further than that, enforcement of the demands arising in and from the one state will tend to precipitate a like situation in the several other states served by such carrier. That will produce two other results: First, serious impairment, if not absolute breaking down, of an important interstate carrier, a unit of the national transportation system with which Congress was dealing when it passed the Transportation Act of 1920. Second, a sharp conflict with the Congressional policy and utter demoralization and destabilization of the whole scheme of rate making, resulting in the complete breaking down and ultimate failure of the Congressional purpose; a purpose founded on a power confided in Congress by the Constitution and by virtue thereof, lawfully exercised. May the state thus set that at naught? May they disregard the policy, the purposes, the necessity of the enactment?"

Objections by State Commissions

John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, has sent a copy of the decision to each state commission with the following comment:

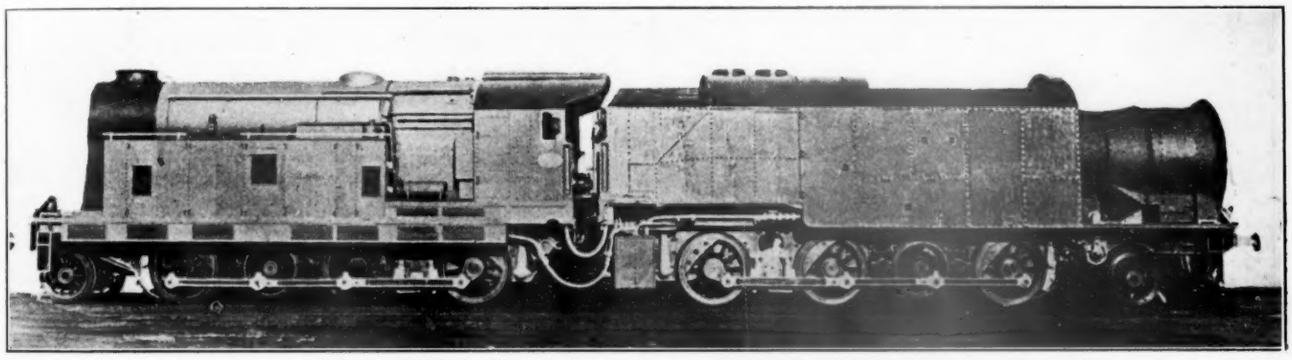
"If anything is certain as to the intent of any legislative body, I believe it to be certain that Congress never intended to disable state authorities from making requirements of the kind held interdicted by the South Carolina court. And if the Transportation Act is construed to have created such disability, I do not doubt that Congress will remove it, if proper appeal for relief is made. When the Supreme Court of South Carolina holds, as it has held in this case, that powers reposed by South Carolina in its state commission have been taken away by an act of Congress, there must be something wrong with the language of the act, if that was not the intent, and Congress may well be asked to speak more explicitly."

Ramsay Turbo-Electric Condensing Locomotive

An Interesting Experimental Locomotive Which Has Been Under Development in England for Two Years

THE RAMSAY turbo-electric condensing locomotive was built by Sir W. G. Armstrong, Whitworth & Company, Scotswood Works, Newcastle-Upon-Tyne, Great Britain, in 1921 for the Ramsay Condensing Locomotive Company. This locomotive was designed for experimental purposes and during the past 18 months has been submitted to numerous stationary and road tests, various modifications being made from time to time as experience dictated. The results have been so encouraging, however, that a new locomotive embodying the same principles is now being designed. While several references have been made to this interesting locomotive, only the most general data has thus far been published.

The locomotive is 69 ft. 7½ in. long overall, weighs 293,000 lbs. in working order and has a rated tractive force of 22,000 lbs. It consists of two sections connected together by a universal joint. Each section is carried on three pairs of driving wheels and a two-wheel truck. The front section contains the boiler under which is placed the main turbine and generator and the auxiliary turbine and generator, while the back section contains the condenser with fan, water tanks and coal bunker. Communication between the turbines and condenser is by way of an exhaust pipe which is provided with a flexible rubber connection reinforced with aluminum rings.



Ramsay Turbo-Electric Locomotive of 22,000 Lb. Tractive Effort

Power is developed in the main turbine and the transmission of power from the turbine to the locomotive wheels is by electrical means. The turbine is coupled to an electrical generator, the electrical energy from which is transmitted to four motors, two of which are fitted to the wheels of the front section and two to the wheels of the rear section.

The main turbine is of the impulse type and contains nine stages, the mean blade diameter being 36 in. It is designed for a steam pressure of 200 lb. per sq. in., superheated 300 deg. F., and exhausting to a vacuum of 27½ in. The maximum speed of the turbine is 3,600 r. p. m. The main turbine drives a three-phase generator, which is designed to develop 890 kw. at 3,600 r. p. m., the pressure then being 600 volts.

The auxiliary turbine, which is a single stage one, drives a direct-current dynamo, which excites the poles of the main generator and also provides electrical energy for the motors driving the condenser fan, the condenser rotor and the extraction pump and also the current for lighting the train. This turbo-set runs at 3,600 r. p. m. and is subjected to the same steam conditions as the main turbo-set.

The boiler is supplied with air by a forced-draft fan placed in the cab. The grate area of the boiler is 28.5 sq. ft.; the heating surface, 1,243 sq. ft., and the superheater surface 300 sq. ft.

The Condenser Design

The condenser consists of an annular nest of tubes built into two headers; the exhaust steam from the turbines enters one header, passes through the tubes, is condensed and the water resulting from the condensation is collected in the other header. From there the water passes into a well and is eventually returned to the boiler to be converted into steam again.

The accelerated evaporative principle is employed in the condenser. The nest of tubes is in the form of a drum which rotates in bearings. The drum is housed in a tank, the bottom of which contains water kept at a constant level by a pneumatic float valve. The tubes pass through the water as they rotate. After they leave the water, rapid evaporation is produced by passing air over them at a high velocity and the result is a correspondingly rapid condensation of the steam inside the tubes. The air is supplied by a specially designed fan. The inlet to the fan has a scoop or air guide which forms an easy path for the entering air and so eliminates the losses from the shock which would occur if no such provision were made.

The water used in the boiler and that used for wetting the tubes are kept separate. The former is used in a closed circuit and is not wasted except by small leakages, hence very little new water is required. The advantage of this is specially felt where locomotives are obliged to use bad water which results in rapid deterioration of the boiler. By using a condensing system, taking in bad water during runs is obviated as ample water can be carried to satisfy any run that the locomotive may be called upon to perform. A prolonged life of the boiler is insured in any case by using a condensing system because shortly after the run the feedwater becomes partially distilled. Wetting the tubes by impure water does not affect the vacuum, neither does it injure the tubes. Repeated tests having shown this to be the case, any water may be used for condensing purposes.

The Electric Driving Motors

The four main driving motors are of the alternating current slip-ring type, ventilated by fan runners mounted on the rotor shafts. The continuous output capacity of each is 275 brake hp. with one hour's rating at 360 brake hp. The speed of the

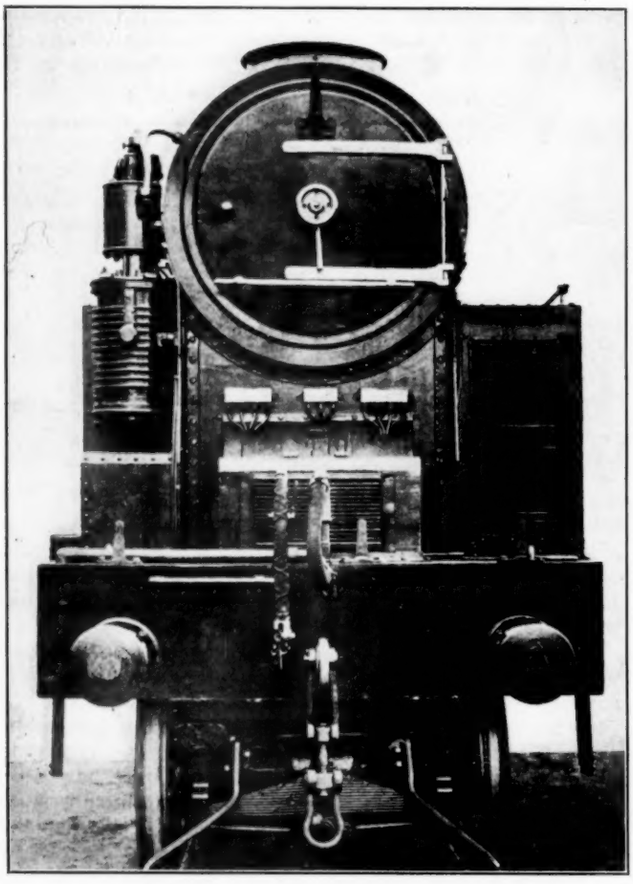
motors at 60 m. p. h. is 1,175 r. p. m. and the pressure 600 volts. Each pair of motors is belted to a center stretcher carrying a transmission shaft and spur wheels. Pinions are keyed to the motor shafts and these gear with the spur wheels, the power being transmitted through coupling rods from the spur wheels to the driving wheels in the ordinary manner.

The following are the tractive efforts at the rim of the wheels for the acceleration period from starting to 60 miles per hour.

Speed, m. p. h.	Tractive Force
Starting	22,000 lb.
15	22,000 lb.
30	11,050 lb.
60	8,600 lb.
Normal running	
60	6,000 lb.

The starting torque of the motors is about three times that of the normal and it is obtained as follows: Before starting the locomotive, the auxiliary turbine is run up to full speed, thus providing excitation for the main generator and energy for the auxiliaries. The main turbine is then run up to half speed; viz., 1,800 r. p. m. At this period the motors are connected in series. It is then that the locomotive may be started.

When a turbine speeds up from rest to full speed its torque

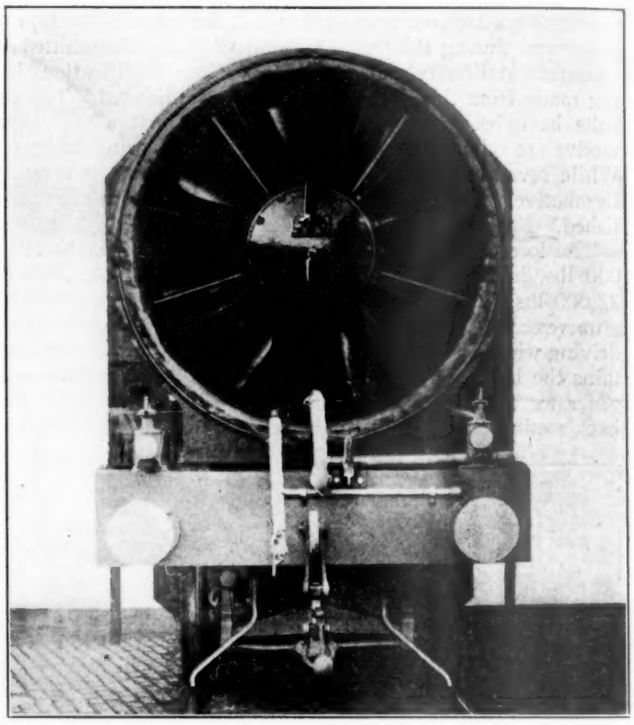


Front End View of Ramsay Locomotive

decreases in the ratio of two to one, and when passing through half speed its torque is one and a half times the normal and this is the torque of the main turbine when running at 1,800 r. p. m. Again, two alternating current motors when connected in series and running at half the speed of the generator have twice the turning moment which they have when connected in parallel with the same power consumption. Therefore, with the motors in series and the turbine running at half speed, the torque from rest to quarter speed will be two times one and a half, or three times the normal torque. The motors are now connected in parallel, the turbine still running at half speed, and the speed of the locomotive increases from one quarter to one half speed, the torque at the latter speed being 1.5 times the normal. After this the turbine speed is brought up to its maximum and the torque drops from one and a half times the normal to normal.

Results of Tests

The present locomotive is, of course, purely an experimental one and for demonstration purposes. The trials have been



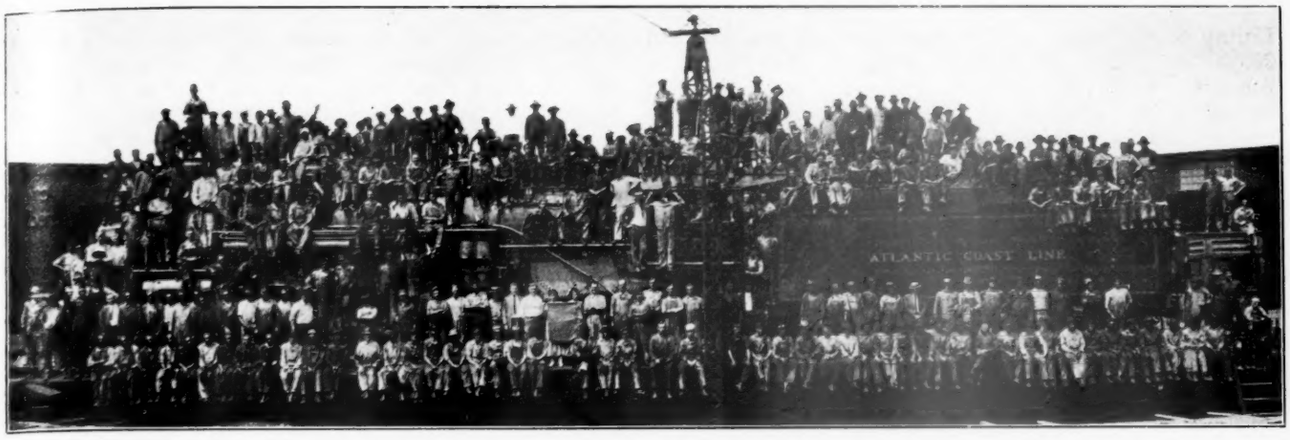
Rear View of Ramsay Locomotive with Air Scoop Removed to Show Condenser Fan

very exhaustive and have extended over a period of 18 months or more.

By disconnecting the terminals of the generator from the motor and connecting them to water resistances, the turbine and generators can be run when the locomotive is at rest, the electrical energy being dissipated by heating up the water. This affords a convenient means of testing the condenser and taking readings which would be difficult to obtain while running. Numerous tests have been made under these conditions and considerable valuable data collected. In addition to these tests, many runs have been made between Horwich and Bolton and others between Horwich and Southport. During all these runs, a breakdown has never occurred. On one of the runs a distance of 100 miles was traversed and a speed of 60 m. p. h. attained with a load of 275 tons.

The efficiency of a turbo-condensing locomotive mainly depends on the design and operation of the condenser. Tests have shown that a condensing apparatus can be placed within the confined space of the locomotive which will maintain the required high vacuum necessary to deal economically with large loads.

The Missouri Pacific has increased its average miles per car per day from 20.84 in April to 31.98 in August. During August the road also established another record by loading locally and receiving from connections 130,810 cars compared with a previous record of 125,347 cars in October, 1916.



Safety Committee and Other Employees of Atlantic Coast Line Shops at Savannah, Georgia. Five Hundred and Fifty-four Employees in These Shops; Only One Personal Injury in Three Months

Railroad Safety Officers Meet at Buffalo

Application of Golden Rule Emphasized in Interests of Safety and More Efficient Operation

THE STEAM RAILROAD SECTION of the National Safety Council met at Buffalo on October 2, 3 and 4, in connection with the 12th Annual Safety Congress. The Steam Railroad Section is only one of 24 sections which held meetings in connection with the Congress, but it had very nearly 300 members in attendance. The president of the Congress this year was Marcus A. Dow, formerly of the New York Central. The officers of the Steam Railroad Section were: chairman, L. G. Bentley, general safety agent, Chesapeake & Ohio; vice-chairman, J. G. Fitzhugh, superintendent of safety, Gulf, Colorado & Sante Fe; and secretary, L. P. Green, superintendent of safety, Minneapolis, St. Paul & Sault Ste. Marie. The chairman of the program committee was W. S. Wollner, general safety agent of the Northwestern Pacific.

Chairman Bentley, in speaking on The Railroad's Responsibility for Employee Safety, said in part:

"Education, prohibition, reasonable working hours and appropriate discipline for violation of rules, have raised the standard of railroad employees and produced men who regard the safety of passengers and their personal responsibility therefor as of first importance. It is inconceivable that such men should take chances with the lives under their care; the supervising officer who would permit it to be done, would not long remain an officer. Because of the acknowledgement and faithful discharge of this responsibility, a person is safer traveling on American railroads than walking on the city streets.

"It goes without saying that conditions should be made just as safe as it is practicable—and this responsibility does not lie wholly with the railroad. Employees are in constant and close touch with their surroundings, they know the conditions which under ordinary circumstances are safe, and they also know when these conditions carry hazard for those working on the premises. The responsibility for reporting this condition lies with the employee, the responsibility for prompt action with the employer.

"It is generally found that in a ratio of about ten to one, employee injuries due to the acts of the employees predominate; these acts are not always nor in major part due to wilful acts of carelessness or disobedience, but are more often the result of impulse or a mistaken idea as to what is desired by the supervising officers. The gravest responsibility of the railroad for the prevention of accidents is in regard to educational measures.

"The railroad has a very great responsibility in the matter of determining and acknowledging the true causes of accidents. It is unfortunately true that some divisional officers, thinking to avoid censure of their superiors, find it easy to reach a decision that absolves them from blame and places the responsibility on the man in the cemetery or the hospital. This is not always wilfully done, as the analysis and decision frequently become matters 'of least resistance.' A superficial analysis sometimes enables the compilation of a favorable report from a claim standpoint and the evasion of supervisory responsibility, whereas to dig deeper, would possibly disclose something fundamentally wrong either in conditions or practice. We might as well be honest about it, and carry the burden if it belongs to us; for those who know the true facts are always ready to exploit them on occasion."

Safety Education in Public Schools

Dr. George E. Paine, professor of educational sociology, New York University, made an address on "The Railroad Man's Approach to Safety Through the Schools." He said in part:

"The railroads have made operations so safe that a person is actually in less danger traveling upon the modern railroad than he is in walking upon the streets. The railroad Pullman coach is the safest place in America today. This achievement also is marked in the reduction of accidents to employees. It is safe to say no industry has fewer accidents to its employees in proportion to the number of men employed and the necessary hazards involved.

"The serious aspect of the problem of accident prevention lies not in the accidents to the general public or employees, but in the accidents to the motorist over which the railroads have absolutely no control. For that reason it becomes absolutely imperative that the railroads must develop safety through some other means than that of the employees and the railroad traveling public. The problem is a matter of educating the general public, particularly the motor driving public. There are in the schools of the

United States today 800,000 public school teachers and 20,000,000 pupils representing virtually every home in America. When one conceives this situation, he has the answer to the problem of insuring safety. If 800,000 teachers should bring to the attention of 20,000,000 school children the dangers of playing on railroad tracks, of crossing railroad tracks, and the need for extreme care when approaching a railroad, the trick would be turned.

"I remember a few years ago in the city of St. Louis we discovered that there were a number of deaths and accidents resulting from children playing on railroad tracks. A simple statement from the superintendent to the teachers of that city indicating the causes and the needs for the observance of safe practices led to the total elimination of accidents from these sources. There is now an adequate program and an abundance of material available for making clear to superintendents, principals, and teachers, the problem and method of safety. If the railroad men of the country are willing to get back of an adequate program they can do more than any others in the elimination of accidents and the conservation of human life."

An open discussion of this question at a later session indicated the advisability of preparing a series of short, interesting pamphlets for distribution to the school children throughout the country. It was felt that this effort might well be carried on under the direction of the National Safety Council. The school authorities in most places are in hearty accord with educational work of this kind and the sentiment was that it should be carried out on a national scale and preferably should consist of a series of pamphlets which should be distributed at regular intervals.

The Bureau of Explosives

Col. B. W. Dunn, chief inspector of the Bureau of Explosives, New York City, made an address on the "Public Aspect of the Work of the Bureau of Explosives." In commenting upon the results obtained through the work of this bureau, he made the following statement:

"About 400 million pounds of explosives are produced annually in the United States and Canada, and much of this total is shipped more than once. We can never hope to eliminate expensive accidents in any department of railroad operation. The best we can do is to establish and hold an equilibrium between our maximum effort for safety and the average of forces that work for destruction. We have reduced our transportation losses for explosives to about $33,000 per year. For all other dangerous articles the total is 1¼ million dollars per year. The possible losses that constantly confront us, however, are very disturbing. At Ardmore, Oklahoma, in 1915, an accident caused by a tank car of casinghead gasoline cost over one million dollars. In spite of our best efforts, the destructive forces that menace us may duplicate or approximate this disaster at any time. In the meantime, let us take comfort and encouragement from the fact that in the year 1922 the total losses incident to the transportation of explosives, ammunition, and fireworks of all kinds in the United States and Canada, amounted to the magnificently small sum of $75; and not one life was lost."

Accidents Due to Mental Causes

Two remarkable inspirational addresses were made on the second day of the meeting. Isaiah Hale, safety superintendent, Atchison, Topeka & Sante Fe, received an ovation after his address on "The Mental causes of Personal Injuries." By far the greater proportion of accidents are due to non-physical or mental causes. He indicated the necessity of taking steps to get the employees into a right mental attitude, or if they are so constituted that this can not be done, to place them where they can not endanger the safety of others. He emphasized the importance of right thinking, since this is responsible for a man's actions.

Rev. Walt Holcomb of Cartersville, Ga., a son-in-law of the evangelist, Sam Jones, spoke on "Am I My Brother's Keeper?" Among other things Mr. Holcomb told of the splendid results which are being obtained at highway crossings by the stop law in North Carolina. The contrast between the way in which the automobilists approach crossings in North Carolina is very noticeable as compared to conditions in neighboring states.

Pullman Safety Methods

A paper on the Pullman Company's contribution to railroad safety was prepared by E. F. Carry, president of the Pullman Company. This company is directly concerned with the handling of 34,000,000 passengers a year. It has a thoroughly organized safety department, including safety committees in the manufacturing and repair shops, a conductors' and porters' safety committee in each district and a joint safety committee in each of its 300 cleaning yards. These committees meet monthly to discuss ways and means of preventing accidents and all of these employees are urged to make recommendations for improving the safety of Pullman travelers. Many prizes are awarded each month for suggestions which prove practical.

Mr. Carry outlined the mechanical improvements which have been developed on the Pullman cars in the interests of safety, including anti-telescoping devices, the six-wheel truck and a large number of other details. Sanitation is, of course, a most important factor and the various measures for insuring cleanliness in the Pullman cars were described in detail. It is essential to the safety of travelers that healthy men compose the train crews and particularly that they be free from communicable, infectious diseases. The policy of the company is to hold men who are so affected out of service, healthy men only being employed. The company is now engaged in making a complete physical survey of the porters and this will be repeated periodically in the effort to contribute greater safeguards to those whom they must serve.

Selling Safety to the Man on the Firing Line

William N. Doak, vice-president of the Brotherhood of Locomotive Trainmen, in speaking on the above-mentioned topic, said:

"Right living, right thinking, right working and right playing are some of the attributes of the safety first movement. We have more interest than the mere effort to teach carefulness in so far as our bodies are concerned; more in common with humanity than to teach men to look out for their physical needs and wants; we have the higher duty of creating in them the interest in all humanity, that of looking for the best in our fellow men and helping them to express these good things.

"The peace of mind of the individual plays a more important part in our successful endeavors than one may imagine at first glance. Worries of any character will no more mix successfully with railroading than will water with oil. Many things may cause worry or disturbed condition of mind. The more frequently brought to my attention are those concerning the administration of discipline and the personal handling of employees by superiors. Train delays of apparent unnecessary duration, partiality and favoritism, together with over-zealousness on the part of officers and fellow employees, many times tend to disturb the peace of mind of employees, and as a result carelessness and indifference follow with the attending allies, accidents, resulting in injuries, death or property destruction. Weed out elements of discord as you would the tare from the wheat.

"Security in employment is of paramount importance to successful performance of duty. Were each employee, who is worth while, properly impressed with the fact that he is

secure in his position so long as he obeys instructions, lives up to the rules and is careful, we would find the best results following. Above everything, eliminate the feeling of 'It's hell if you do and hell if you don't.' This spirit will not only wreck your safety efforts, but as well, the success of your industry.

"Good wages, properly and discriminatingly distributed in such a manner as to compensate in proportion to the services performed, are of such magnitude that we may well turn our attention to them as having the most telling effect in the operation of trains and the general safety first movement. Safety first principles demand that we all boost for fair wages as the best step toward responsibility, and recognized responsibility leads to safety.

"Our forty or fifty years of agitation for safety legislation in the state legislatures and Congresses has given the railroad brotherhoods a fair insight into safety progress. All movements contemplating changes in thought and action are slow, and in general the safety movement has been slow, but fortunately progressive and forward. There are other evidences of what has been accomplished by constantly keeping at a right principle. For instance, your own movement is a splendid example. Your safety first movements were regarded at one time as unsound theories, or hobbies. However, recently I was told by a high official of an important railway that the best asset his line had and the biggest dividend payer was the safety first movement. Others have told me that through the good work of their safety first movements they had turned losses into profits—thus disproving the old theory of these movements being expensive.

"Labor organizations, such as ours, at first looked with some skepticism upon the safety movement but have now so far changed their viewpoint that 'safety matters' are not only a part of their work, but an order of business in their ritual, thus making it an important part of organization work. The reason for this change of opinion is education and fair dealing. The results are written in undeniable evidence on our accident records and insurance reports—thereby proving that the movement has had tangible value to us from a purely organization standpoint in dollars and cents.

"An erroneous idea has been too long prevalent in this country that the railroads and their employees were pitted against each other. Of course, there has been the desire on the part of some to cause friction in the hope that these two may not unite for mutual benefit and protection. There is no industry on earth where closer co-operation should prevail than between investor, management and employees of the railroads. Their interests are common and they should be encouraged in their efforts of co-operation. The only reason they are encouraged to do other than work together is because some outsider desires to profit by their differences. It is not only safety, but it is safety first to assist in uniting these principles in this great industry behind the common cause for the common good. In selling safety to the men on the firing lines, instill in them the spirit of co-operation and confidence."

Selling Safety to the Management of a Large Railroad

H. A. Adams, assistant to the general manager, Union Pacific, in speaking on this topic said in part:

A few of the larger systems are out of alignment in this movement; "safety first" is more of a platitude or precept than a policy with them. No railroad management can be uninformed or indifferent to the achievements of this safety plan; such roads as have not as yet awakened to importance of this work must needs be convinced by compelling arguments and silencing evidence, to bring them to its realizations.

Admittedly, officers intrusted with the management of Class One railroads are of broad vision, so when any of their group fails to enlist in the cause of safety first, it can be attributed to misdirected effort of someone. I feel safe in the assertion that, had this plan been earlier and impressively placed before men in high places, there would be no Class One carrier today without its safety organization.

The extent of investment in money and men engaged in the work must vary, of course, on different properties, dependent upon the needs and the financial ability to carry on the work.

There is no argument about usefulness of the common household broom but the man of today who would distinguish himself as a broom salesman must convince that the broom which he is selling has qualities superior to others offered by competitors. We can urge the purchase of safety for many reasons, but certainly for the following:

1. It is American. It is based on the cardinal principle of Justice.

2. It is humanistic. It is one of the best vehicles of the day for expressing our belief in the brotherhood of man and our acceptance of responsibility for our brother's welfare.

3. It is economically sound. The American Railway Association has indicated its faith in the necessity and practicability of the program.

4. It makes for efficiency. Labor turnover is one of controlling importance in maintenance and operation of railroad property. "Safety first" stabilizes and makes for contentment and dependableness. There must be increased efficiency and loyalty in safety. While safety-first should never be accepted solely on the basis of economy, it is established that in guarding against personal injuries and casualties, working conditions are bettered.

To be a successful salesman of safety, you must first be a safe man yourself, so far as humanly possible. We shall do well to remember at all times that he who is safe in thought and safe in word can more reasonably be expected to be safe in action. By adherence to these principles we shall furnish that more valuable thing, the example, which even more than the precept, will be most persuasive of all arguments to be employed in selling safety first.

A. V. Rohweder, supervisor of safety, Duluth, Messabe & Northern spoke on the same subject from the viewpoint of a small railroad. He outlined in detail the safety program followed by his road.

Safety as a Builder of Morale

F. W. Mitchell, director of personnel, New York, New Haven & Hartford, made an address on "Safety as a Builder of Morale" in which he said:

No mechanism that functions in the production of transportation is as complex in its makeup as are the human beings to whom its operations are committed. And although the human element is susceptible to great changes, by means of education and training, it can hardly be argued that the same effort has been given to railroad "humanics" that has gone into the development of the mechanical resources. It would be difficult to describe just how we should proceed, in order to attempt in this field the accomplishment that is apparent in the mechanical. Some things, however, are evident, and among these we find first that there should be greater care used in selecting our human material, investigating the references presented and the conditions which surrounded the new employee before taking him into the organization.

For a number of years the railroads have been carrying on safety work. The benefits derived from this effort have been far in excess of the cost of the work. It is not too much to say that the entrance into the larger field, and the expanding activities which are directed toward the develop-

ment of morale have resulted in a measure from the evident effects of the safety work in this direction.

There was unquestionably a time in the history of our American railroads when the voice of the public was calling loudly for speed in annihilating distance together with reliability in maintaining schedules. The effect of this strong sentiment was to increase, in no small degree, not only the number of "chance takers" in train operation, but also the extent of the risks that they were willing to take. Operating officers noted their violations of rules and instructions when conspicuous consequences compelled recognition. Investigations of accidents revealed such information only as it was impossible to conceal. A spirit of competition and rivalry tended to further aggravate the dangerous situation. Cautionary measures were set aside by the employee if so he might thereby execute some stunt which, if successful, might mark his exceptional ability. There was a wide separation in the theory and practice of safe operation. Confidence was weakened; morale reduced. That which should have been an army of organized workers for safety was slowly becoming a mob of "go as you please as long as you're lucky" buccaneers.

Even the grounds for promotion were becoming more and more based upon the element of "luck," and the "good guesser" could ride the top wave of popularity. Safety was becoming an artificial veneer.

But there was a penalty to all this and from time to time it presented stern demands. It became evident that something was going very wrong and that a change was required not only in methods but in the appraisal of values. Safety first was made the slogan for the railroad workers. Committees were appointed. Meetings were held. Conditions were revealed which needed correction. The mirror was held up before dangerous practices that showed them in their true aspect. Officers and men were brought into close personal contact in the pursuit of safety. Together they searched for the remedies for situations which their new relationship was compelling them to face, and together they began to realize that their interest was common in endeavoring to find an answer that would satisfy the conscience of each that the requirements of safety were being met.

When Morale Appears

When the enlightened conscience is satisfied with the contacts with life, as it is expressed in action as well as in word, that elusive and almost indefinable element which we call morale, appears; because an atmosphere which is conducive to its growth and development has been found. There is something in every real man that calls him to put his best effort into his work. He may vary somewhat in his response to this call, but the knowledge that he is working together with other individuals in the army of employees to carry out a program for protection, is a compelling force; because it is founded in sincere endeavor, and carried out in the spirit of service. Its outgrowth is quickened morale. The whole trend of the safety work is toward the promotion of those forces, sentiments and actions which inspire respect, loyalty, and efficient service. The work furnishes a point of contact between employer and employee that is mutually advantageous. From the experience there comes the knowledge that other points of contact are available, and the means of securing them follow closely.

The principles on which safety work is founded, the sentiments which it fosters and the methods by which it develops have done more to build up morale upon the railroads than any other single agency. It has made for itself a place by providing an avenue for the expression of opinion, as well as the compulsion of safe practices, which entitles it to all the aid that can be extended, to the end that the work which it has begun in building up morale may be continued, sustained and enlarged by whatever additional means may be provided to accomplish so important a task.

Other Papers

Roy V. Wright, managing editor of the *Railway Age*, in speaking on publicity as an aid to the railroad safety officer, called attention to the army mental tests. He indicated that we must recognize the low standard of mentality of many of the employees and adjust the publicity and educational work accordingly. Publishers of some of the daily papers recognize that a large proportion of the population is not fitted mentally to receive even a complete grade school education; they therefore use methods to appeal to these elements. Railroad safety officers should study their methods and those of other educators, and utilize them as far as possible.

An illustrated address on "The National Cost of Accidents as it Affects the Railroads" was given by Lew R. Palmer, conservation engineer of the Equitable Life Assurance Society. A series of charts and tables was presented showing the tendencies in railroad accidents on several different bases and also giving approximate costs of these accidents over a period of years. The material is not available for publication at this time, but an abstract of Mr. Palmer's paper will be presented in a future issue.

Several subjects that were of special interest to railroad men were discussed at other sections of the Safety Congress. Two of the most notable of these papers were "A Properly Balanced and Well-Edited Publication a Necessity in Selling Safety," by L. G. Bentley, general safety agent of the Chesapeake & Ohio; and "The Safe Transportation of Acids in Carboys and Drums," by Maurice F. Crass, of the Grasselli Chemical Company.

Topical Discussions

A paper describing a device which will automatically regulate the blowing of locomotive whistles and ringing of bells on approaching highway crossings was presented by Morris A. Welsh, superintendent of the Waterloo, Cedar Falls & Northern. This device has been tried on his road and one locomotive is now equipped with it on the Chicago & North Western. The engineer on approaching a crossing, presses down momentarily on a hand or foot lever and the device will blow the whistle and ring the bell in accordance with the legal requirements. The engineer can, however, if he so desires, at any time exercise manual control over these functions. A considerable discussion ensued as to the desirability of operating the blowing of the whistle mechanically.

Several other topics were discussed from which it would appear that it is dangerous to use danger signs in conjunction with advertisements near highway crossings; and that crossing watchmen should be strong, vigorous men of good intelligence.

The following officers of the Steam Railroad Section were elected for the coming year: Chairman, F. M. Metcalf, superintendent safety section, Northern Pacific; vice-chairman, Charles E. Hill, general safety agent, New York Central; secretary, Emerson R. Cott, safety agent, Hocking Valley.

THE ATCHISON, TOPEKA & SANTA FE and the Chicago, Rock Island & Pacific have requested the Missouri Board of Equalization to reduce the valuation placed upon their properties for taxation purposes in Missouri. The Atchison, Topeka & Santa Fe contends that the valuation of $18,448,108 placed on its properties in the 11 Missouri counties through which it passes is on 100 per cent of the value while other property is taxed upon but 58 per cent of its value. The Chicago, Rock Island & Pacific contends that the value of $16,447,000 placed on its property is $858,000 above the real value of its holdings in Missouri.

Western Canada's Unsolved Grain Rate Problem

Removal of Mountain Differentials Would Divert Traffic Westward—Secession Threatened

By Thomas M. Fraser

THE Board of Railway Commissioners of Canada now has before it a reference from the Privy Council of the Canadian cabinet asking that it immediately consider and act upon the appeal of the province of British Columbia for a reduction in grain rates from the prairie provinces of Saskatchewan and Alberta to Vancouver and other British Columbia ports. In referring the matter to the board, the government made the following statement:

"In view of the existing situation in the west in regard to the extent of the crop movement this autumn, and the lateness of the season, the government feels that if any relief can be granted in the way of reducing the rate on grain haul via the Pacific outlet, action should be taken at once. In the original order of the board dealing generally with western freight rates, issued on June 13, 1922, the grain haul was not specifically dealt with in the judgment, and it is this particular end of the whole vexed problem which the government is now asking the Railway Commission to deal with. The cabinet has not given any final ruling regarding the whole case appealed to it, and probably will not finally deal with the matter until the return of the Prime Minister and his colleagues from the Imperial Conference."

This action of the government was taken following a hearing of the question in which counsel for the railways and the western provinces respectively presented their arguments exhaustively. It was simply another chapter in the long and involved history of the protests of the west against the differential scale which exists as between the territories east and west of the Rocky mountains. It is a matter which has bulked very large not only in railroad but in political affairs in Canada, and for an intelligent grasp of the situation the history of some western railway legislation must be summarized.

Rate Control in Canada

Since the formation of the Canadian federation of provinces into the Dominion of Canada in 1867, the Canadian Parliament has had the power to control railway rates, which power was exercised either by itself or some body to which it deputed the task. Until the year 1904 the Railway Committee of the Privy Council was given the power of making such reviews of and changes in rates as was considered to be in the public interest. In that year the Board of Railway Commissioners, the members whereof were appointed for the government, was created. It is composed of six members, who hold office for ten years. They are eligible for reappointment, but this is rarely done. Its decisions are final, subject to appeal to the Supreme Court of Canada on questions of jurisdiction or law, and also to action thereon by the government.

The Crows Nest Pass Agreement

More or less closely connected with this western freight rate question is what is known as the Crows Nest Pass agreement, which has been much before the people and Parliament of Canada in recent years, as it has been made a sort of issue by the western "Progressive," or farmer, political group, and has been a source of sore trouble to the railroad which entered into it. It was, in brief, an agreement made by the Canadian Pacific with the government in 1897 that, in consideration of a subsidy of about three million dollars for construction of a branch line through the Crows Nest pass district in Alberta and British Columbia, the C. P. R. agreed to maintain certain low rates on grain and flour eastward and on other commodities westward, into and from the prairie provinces.

In 1917 war conditions necessitated a general increase in rates, and the Canadian Pacific, in particular, was desirous of being temporarily relieved from this Crows Nest agreement. It appealed to the Railway Commission for a suspension of the agreement. The Commission came to Parliament and asked that the agreement be suspended. This was done —at first for two years, and then for a further period, expiring in 1922. The Railway Commission then asked Parliament to declare its general position on the question, as rate reductions were being pressed in all parts of the country and could not be granted by the board without taking into consideration the future course of rates under this Crows Nest Pass agreement. After long discussion and deliberation, and in the face of strenuous objection by the railways, a special parliamentary committee restored the agreement so far as it referred to rates on grain and flour moving eastward out of the prairie provinces and let the remainder of it rest. This year a further extension was granted for another year, which expires on July 7, 1924.

The Basis for Rates in the Far West

The specific grievance of British Columbia with regard to rates is based on a judgment delivered by the Board of Railway Commissioners in 1914, on what is known as the Western Rates Case, where the principle was laid down that, owing to high grades and other adverse conditions of operation, the railways could haul freight on the prairies 150 miles for the same rate as they could haul the same commodities and quantities 100 miles through the mountains. British Columbia has always protested against this discrimination, and latterly, since western grain has begun to move out via the Pacific and the Panama Canal route, they have been joined in the protest by the province of Alberta. They appealed to the Railway Commission for the elimination of this mountain scale, and the matter was before that body for a year or more.

In June, 1922, a judgment was rendered which provided that the mountain scale should be reduced from the proportion of 1½ to 1, to 1¼ to 1. British Columbia was still unsatisfied, claiming that the mountain scale should be wiped out entirely and all western rates put on the same basis. The province accordingly appealed from the judgment of the Board of Railway Commissioners to the Privy Council, and they included in their appeal the matter of grain moving westward, which had not been covered by the reduction of 1922, as there was no considerable quantity of grain moving by the Pacific at that time. The movement has developed very rapidly in the past two years. Last year about seventeen million bushels went by that route, and with improved facilities at Vancouver in the shape of new elevator and other accommodation, a very much larger movement is looked for.

The Privy Council, as noted at the beginning of this article, made a special reference of the grain question back to the Railway Commission, and reserved the general question of rate reductions for further consideration. It is generally anticipated, however, that the whole subject matter of the appeal will eventually be referred back to the board.

The judgment of the board in 1922 was that rates on the

movement of goods in British Columbia and inter-provincially between British Columbia and Alberta on the Pacific standard mileage were to be constructed by applying to the prairie standard tariff for distances up to and including 750 miles, one and one quarter miles for one mile. This decision was justified by the board on the ground that the cost of operation and construction of the railways through the mountain sections was greater than on the prairies or on any other part of Canada through which the railways run. The railways have vigorously fought against any interference with this principle.

They claim that if the reductions asked for by Alberta and British Columbia are granted, the other parts of Canada will use this as a ground for urging reductions, and the whole rate structure of the Dominion will be upset.

Upsetting Differential Would Divert Traffic Westward

The manufacturing and distributing interests in Winnipeg and the east are not favorable to the claims of the west. Indeed, the provincial government of Manitoba, and the Winnipeg commercial interests were represented before the Privy Council in opposition to them. It is feared by them, and with good reason, that the wiping out of the differentials will divert the distribution of goods from the present channels via Montreal and Atlantic ports to Vancouver, Prince Rupert and the Pacific; will transfer a portion at least of the manufacturing industry of the east to those centres, and take away from eastern manufacturers and Winnipeg distributors the market of the prairies. The remarkable increase in wheat exports via Vancouver has accentuated this fear.

So far as wheat is concerned, the special reference of this matter by the Privy Council to the board with the intimation that it is desirable that action should be taken at once so as to affect this year's big crop, is looked on as practically equivalent to a suggestion for reductions, and there is not much doubt that reductions will be recommended by the board. This will have the effect of further encouraging this movement of grain via the Pacific-Panama route, and the Vancouver Harbor Board and others interested there are confidently predicting a movement of not less than fifty million bushels by that route this season. The fact that the United States lake boats are refraining from engaging in the Canadian lake traffic owing to unwillingness to conform to the new Canadian regulations means the possibility of a blockade on the lake route and the diversion of all possible grain via the Pacific. The limited elevator capacity at Vancouver has led the railways to announce a regulating embargo at that port so as to prevent congestion in the elevators and the holding up of cars.

The principle on which British Columbia and Alberta rest their case for rate reductions is that a transcontinental railway system should not be allowed to segregate one section of its route where conditions are adverse and charge tolls on traffic over that section sufficiently high to offset in a financial way the difficulties encountered. They say that costs of construction and operation in the east are fully as great as in the west; that if extraordinary expenditures like the Quebec bridge over the St. Lawrence and construction around the great lakes are to be absorbed by the system as a whole, there is no reason why the same principle should not apply to the mountain barrier, which they figure out as amounting to only 24¼ miles of maximum gradients against westbound and 58 miles against eastbound haul. They claim that it is the "long haul" the railways are seeking, and that they are not desirous of seeing British Columbia manufacturers in a position to ship into the prairies goods which have hitherto been coming from the eastern provinces.

Comparative Costs of Railway Operation

The railways have submitted figures to prove that the population per mile of railway, the diversity and the density of traffic were in favor of the prairie as against the mountain division, and that if costs were high and rates low on the Maritime Provinces divisions, water competition together with American rail competition to the Atlantic seaboard were the governing influences in rates there. The percentage of increased operating cost on the British Columbia district over the balance of the lines in the west was given by the railways as follows: Per mile of line, 22.68; per train mile, 34.67; per car mile, 50.35; per gross ton mile, 48.03.

C. N. R. Not Taking Active Part in Debate

It should be noted that while the Canadian National Railways "sat in" at all the various discussions on this question, and was represented by counsel before the Railway Commission and before the Privy Council, it has never taken an active part in opposing the western claims. Its grades through the mountains are admittedly much more favorable than those of the Canadian Pacific. G. G. McGeer, of Vancouver, the counsel who has handled this fight of British Columbia and Alberta since it began, submitted figures to show that grades on the Canadian National between Edmonton and Vancouver westbound were .4 per cent except on a distance of 10 miles where they were the maximum of .5 per cent. The summit was 1,600 ft. lower than that on the Canadian Pacific. Eastbound the maximum grade is .7 for 28 miles and .4 for the remainder.

In giving evidence before the commission which is now investigating the grain trade, Sir Henry Thornton, president of the Canadian National, was asked: "Why does not the Canadian National lower its rates? It has not the same difficulty with regard to mountain grades that the C. P. R. has." He replied:

"Well, I suppose largely for the reason that there seems to be some reluctance on the part of most individuals to make a noise like a philanthropist. It is a well-known fact that the grades on the Canadian National are more favorable to traffic between the prairies and the Pacific Coast than is the case on the Canadian Pacific; and it is also a fact that for that reason we might be able to stand a lower rate; but on the other hand it is rather inconceivable that any rate that would apply to us would not apply to the C. P. R., because freight rates must necessarily be equal between competing lines between two places, otherwise one gets all the business. . . . I suppose it is reasonable to assume that somewhere in this western country what you might call a traffic divide will develop. Just where it will come, I could not say at the moment, but in time it is bound to come."

Secession from Dominion Threatened

F. B. Carvell, the chairman of the Railway Commission, aroused great resentment on several occasions by speaking rather more frankly than was advisable on the motives which he considered were actuating the western agitation for reduced rates. He stated that it was "more political than real." So far as British Columbia is concerned, there is not lacking a suspicion that the government of that province is not entirely unaware of the political advantages which might accrue from a removal of the differential rates; but the fight is far more than political, and the west declares that it will carry its fight to "the foot of the throne" if necessary, and appeal to the Privy Council in England. Even separation from the rest of Canada, or at least from the more easterly provinces, is being threatened by some of the more extreme unless the discrimination in rates is removed.

A STATION SERVICE MANUAL has been issued by the Southern Railway, a booklet of 90 pages outlining the duties of local freight agents and giving detailed instructions regarding the receiving, checking and handling of freight, the tracing of astray freight, the preparation of bills, the handling of claims and other duties.

Railways of India Adopt Revised Statistics

Revision Follows Careful Study of American and English Methods—Many American O. S. Units Selected

By Brevet Major F. H. Budden, M. C., R. E.
Indian State Railways

IN TWO PARTS—PART II

ONE QUESTION that is very important when dealing with statistics is the question of compilation. Statistics are of little use unless they can be readily and cheaply compiled and this point was specially referred to in one of the terms of reference for the committee on the revision of statistics used by the Indian Railways. The difficulty met with in India is that returns furnished by railway employees cannot be trusted unless they know that such returns can be checked. For this reason, it has been necessary in the past to centralize the compilation of many returns. Methods of compilation in all countries divide themselves under two fundamental heads which for convenience may be described as—

(1) The station-to-station method, and
(2) The method of a density record.

All railways in India except one and, so far as has been verified, all railways in England work on the station-to-station method.

Station-to-Station Method

The method under this system consists in compiling the quantity of traffic which has passed between each pair of stations for the period dealt with. When the quantity of traffic which has passed between each pair of stations has been calculated, these figures become the basis for the calculation of the statistical information either by the railway itself or by the central authorities. Ton-miles for the railway, for instance, are obtained by multiplying the tonnage which has passed between each pair of stations by the respective distance and by adding these results together. A similar process in principle is applied in obtaining all other unit-mileages.

If such information is wanted for a section of a railway, the weights of all traffic between those pairs of sections which would pass over that particular section are selected; these selected entries are grouped according to the mileage traversed in each case over this section. The weight of each group is then multiplied by the mileage shown against it and the total of these results is the ton mileage of that section.

Example of Work Entailed in Station-to-Station Method

A simple example will perhaps bring out the amount of work necessary under the station-to-station method of calculating such figures as ton-miles, etc.

As an example, the case of a railway consisting of eight stations A, B, C, D, E, F, G and H, of which A, E and H are junctions with foreign lines, may be taken. Let the traffic from A to B be ab, A to C ac, etc., and that from via A to B be vab, via A to C vac, etc. Then supposing every station to move traffic to every other station on the railway the transactions are tabulated as shown in the next column.

The traffic thus requires in the case of a railway of eight stations (counting every foreign junction as two stations) to be separated in the statement into $11 \times 10 = 110$ divisions. If the number of stations is 900 with 10 foreign junctions, the number of divisions by the same rule would be $910 \times 909 = 827{,}190$. In actual fact, however, every station does not ship to every other station, so that, though the actual statement in which the information is posted will not be diminished in size, the actual postings in it will be fewer than the above number. If on the average each station ships to 10 per cent only of the other stations, the actual number of postings required will be 82,719. After these postings have been made, a similar number of calculations will, under the process described above, give the ton mileage for the whole line. If, in addition, ton-miles by 12 commodity heads are required, the number of postings and calculations necessary would be $12 \times 82{,}719 = 992{,}628$ in each case. Should figures be required for sections of the line, the weights of all traffic between those pairs of stations included in above totals which pass over that particular section must be first selected and treated as described above.

	Via A	A	B	C	D	Via E	E	F	G	Via H	H
Via A			vab	vac	vad	va ve	vae	vaf	vag	va vh	vah
A			ab	ac	ad	a ve	ae	af	ag	a vh	ah
B	b va	ba		bc	bd	b ve	be	bf	bg	b vh	bh
C	c va	ca	cb		cd	c ve	ce	cf	cg	c vh	ch
D	d va	da	db	dc		d ve	de	df	dg	d vh	dh
Via E	ve va	vea	veb	evc	ved			vef	veg	ve vh	veh
E	e va	ea	eb	ec	ed			ef	eg	e vh	eh
F	f va	fa	fb	fc	fd	f ve	fe		fg	f vh	fh
G	g va	ga	gb	gc	gd	g ve	ge	gf		g vh	gh
Via H	vh va	vha	vhb	vhc	vhd	vh ve	vhe	vhf	vhg		
H	h va	ha	hb	hc	hd	h ve	he	hf	hg		

The Density Method

The second method of tabulation referred to above, viz., that of a density record, is the system in use at the present moment on the North Western Railway. The initial tabulation under this method consists of recording against the name of each station the traffic (whether it be freight, passenger, trains, cars, etc.)—

(1) received at the station,
(2) forwarded from the station, and
(3) passing the station.

This tabulation having been compiled, it furnishes the basis

upon which the statistics required are obtained. Seeing that a figure for passing traffic or "density" is furnished, any unit-mileage can be calculated by multiplying the density between successive stations by the distance between them and totaling the results. Ton-miles, passenger-miles, train-miles, passenger and freight-car miles, capacity-miles, engine-miles, etc., are all being obtained by this process.

If unit-mileages of any description such as ton-miles, passenger-miles, etc., by a section of the line are required, the density figures noted against the stations of that section multiplied respectively by the distances between the stations and added together give the required information. There is no need for sections for which figures are to be prepared to be specified beforehand. As the density of traffic in the various units is recorded on every point of the line, any sectional unit-mileages can manifestly be got out directly on the basis of the initial tabulation.

If unit-mileages by subdivisions of traffic (*e.g.*, ton-miles by commodities, passenger-miles by classes, etc.) are required, it is necessary that the traffic (whether received, forwarded or passing) noted against each station should be subdivided according to the detail required. The unit-mileages by such sub-divisions of traffic are then obtainable for the whole line or any section in the same way as noted above.

Example of Work Entailed in Density Method

A simple example will perhaps best explain how this method works.

As in the former instance, the case of a railway with eight stations A, B, C, D, E, F, G and H, of which A, E and H are any junctions may be taken. Let the east and west traffic of the railways be separately considered. Then under this method the following tabulation is prepared:

Miles (1)	(2)	Direction of Traffic (3)	Forwarded (4)	Received (5)	Passing (6)	Ton Mileage (7)
	Via A	↓	Tons 100	Tons 0	Tons	
—	A	↓	60	0	—	—
5	B	↓	70	5	160	800
4	C	↓	100	10	225	900
3	D	↓	30	5	315	945
5	Via E	↓	80	10	340	1700
—	E	↓	120	30	—	—
6	F	↓	50	10	500	3000
3	G	↓	20	80	540	1620
4	Via H	↓	100	20	480	1920
—	H	↓	200	50	—	—

It is evident that A being the first station on the line, there is no received traffic pertaining to the railway at A in the direction dealt with and marked by the arrow heads above. But there would naturally be some forwarded traffic which is shown under column 4.

Similarly the figures against the stations B, C, D, etc., in columns 4 and 5 are the totals of the received and forwarded traffic in the direction noted. The figures against the junctions via A, via E, and via H represent the traffic which has passed on to railway from other lines or has passed off it to other lines.

As regards column 6, "Passing Traffic," the figures are obtained from the figures in columns 4 and 5. Thus the traffic between A and B is the amount forwarded from A to B *i.e.*, 160 tons. Of these 160 tons, 5 tons stop at B but B forwards 70 tons. The traffic between B and C is therefore $160 - 5 + 70 = 225$ tons. The change of density after passing a station is merely the difference between the amounts forwarded and received at that station. The density of passing traffic for the remaining stations is worked out in the same way, the east and west directions being worked out separately. It may be stated that there is no difficulty in obtaining separate totals under "forwarded" and "received" for the up and down directions.

It should be noted that whereas in this example it is suggested from the analogy of the illustration under the station-to-station method that the junctions in this illustration are foreign junctions, the scheme requires that at every junction, whether foreign or not, traffic interchanged between branch lines and main lines should be calculated. It means, therefore, that supposing there are 50 junctions on a railway, a portion of the traffic (*i.e.*, that interchanged between branch and main lines) must be separated into 200 heads, each junction requiring four such separations for all directions.

As regards the quantity of work involved it can be seen that in the case of a line with eight stations altogether 22 divisions of traffic under "forwarded" and "received" and seven calculations for "passing traffic" for each direction are necessary. If the number of stations is 900 and there are altogether 50 junctions on the railway, both local and foreign, then the entire work of posting requires a separation of traffic into 1,800 divisions for each direction for "forwarded" and "received" traffic. The division also of a portion of the traffic of the railway into 200 heads and 899 calculations for each direction are necessary for purposes of the "density" figure. For both directions there are thus in all 3,800 divisions of traffic and 1,798 calculations involved.

After the tabulation has been completed 1,798 calculations furnish ton-miles for the whole railway. If ton-miles for 12 commodity heads are required, the entire process requires a total of $3,800 \times 12 = 45,600$ divisions of traffic, $12 \times 1,798 = 21,576$ calculations for "passing traffic" and $12 \times 1,798 = 21,576$ calculations for "ton-miles." Should figures for sections of the line be required, *e.g.*, any length of, say, 200 stations, 199 calculations in each direction *i.e.*, 398 in all, would supply the information. It is impossible to give in a limited space exact comparison of the labor involved in the two processes; some general idea of it, however, will perhaps be gathered by a comparison of these figures quoted under the station-to-station method.

Use of "Guards' Journals" for Compiling Ton-Miles

Whereas in America, the common practice is for ton-miles to be obtained from returns furnished by conductors of freight trains, it has been considered in the past in India that the figures obtained from returns furnished by conductors would not be sufficiently accurate for compiling ton-miles. Probably, however, this practice will gradually be introduced especially as on one of the main railways the division system of organization has been introduced and the use of conductors' reports enables the compilation of statistics to be decentralized. Moreover, the introduction of train control will enable a closer check to be kept on the working of conductors. Train control is somewhat similar to the dispatching system except that the train controller deals with the station agents and not with the train crew. The engineman merely has to obey signals which are operated under the orders of the station agents.

English Methods of Compiling Ton-Miles

The English methods of compiling ton-miles were considered by the committee but were discarded as the figures obtained are only approximate and are only available for the line as a whole. In England the figures are obtained by multiplying the loaded car-miles by the average load per car. As an average car load for the entire system does not, in the case of the large companies, necessarily give satisfactory results, such companies' systems are divided into areas, and the average car load in each area is applied to the relative

loaded car-miles. The above figures are only approximate, but are said to be sufficiently accurate for the purpose of showing the amount of revenue work done. All English railways, however, do not agree in this opinion.

Method Recommended by the Committee

The method recommended by the committee was the density method as under this method it is possible to show the density of traffic passing over any section of the line up and down (east and west) separately. In the case of freight, the figures will show the number of tons passing between each pair of stations, the number of cars which carried the tons, the number of trains on which the cars were hauled, etc., etc.

The Cost of Compilation

No method of compilation is of any practical value unless the cost is low and this point was carefully considered by the committee. A very careful estimate was made of the cost of compiling certain information under the density method and it was found that for 1/12th of one per cent of the gross earnings of the North Western Railway (mileage 5,500) it would be possible to show in the case of passengers not only the number of passengers of each class which originated on the railway but also the number which traveled over the line and the average distance each class traveled. These figures would be given by sections of the line "up and down" separately and it would then be possible to locate where any falling off occurred and to decide what steps should be taken to prevent this falling off. It would also be possible to compare the number of passengers carried over any one section with the number of seats provided for their carriage. As corridor trains are very rarely found in India, it is difficult for the conductor to count up the number of passengers traveling and to furnish daily returns as is the common practice in America.

In the case of freight similar detailed information would be available by commodities and the average distance each commodity traveled and the density of the movement of each commodity over any portion of the line would be shown. Any falling off in any commodity can be located and the necessary steps taken to correct it by affording extra facilities. At the same time full information would be given about car loads, train loads, coal consumption by sections of the line, etc., and the figures will bring out such factors as whether engine-miles are being cut down when traffic falls down, etc. etc.

Employment of Machines

The above remarks about the cost of compilation refer to the work done by clerical labor as until recently this was the only means actually used in India. But tabulating and sorting machines have lately been introduced on the North Western Railway. The two types of machines which are commonly used in America are being employed, namely the Hollerith tabulating and sorting machine and the Powers tabulating and sorting machine. In addition to the saving in time and the greater accuracy obtainable, it is found that there is a distinct saving in cost in spite of the low rates and wages paid to clerks employed on compilation compared to those paid in America. Compilation clerks start on about $12 or $13 a month and work up to about $40 a month.

Other Points Dealt with by the Committee

The form and scope of the annual report on the operation of railways issued by the government of India were carefully considered by the committee. Of the various annual publications examined, it was noticed that there was a limited similarity in the annual reports of the English, American and Chinese governments but the general sequence and form of annual report of the English railways commended themselves to the committee as the most logical. Indian conditions, however, must be allowed for and certain changes are necessary. In effecting them, the committee made use of such improvements as the perusal of the Reports of the American and Chinese railway systems have suggested.

The general form recommended for the annual report of Indian railways was as follows:

Volume I.—Text of Report: Each chapter corresponding to a statement or group of statements in Volume II.

Volume II.—Section A: Summaries for classes of railways for all India—
(i) Financial summaries.
(ii) Statistical summaries.

Section B: Abstracts of reports of individual railways—
(i) Financial statements.
(ii) Statistical statements.

Appendices.

Annual Report of Individual Railways

The question of what form the annual reports of railways in India should take in future was also considered by the committee and various recommendations were made. So far the reports consist of—

(1) Capital and revenue accounts.
(2) Analysis of working.
(3) Reports by heads of departments on the working of their departments.
(4) Chief auditor's report on the revenue and expenditure during the year.
(5) In some cases a report by the agent.

To take the place of these, the committee recommended that there should be one general report on the lines of the reports furnished by American and English railways.

Division of Expenses

The committee, in addition, made various suggestions concerning the division of expenses between mechanical and transportation as far as the locomotive and carriage and wagon departments are concerned, and the division of expenses between transportation and commercial as far as the traffic department is concerned.

Division of Passenger and Freight

Up to now the division of expense between passenger and freight on Indian railways are based on the gross ton-miles of passengers and freight service respectively. This division is purely an arbitrary one and recommendations have been made that the American system of dividing expenses between passenger and freight should be further examined and, if found suitable, should be introduced on the Indian railways.

Short Line Association Discusses Its Problems

THE American Short Line Railroad Association Convention, which was held at Chicago on October 3 and 4, was attended by representatives of 250 member lines and others, making a total of 500. President Bird M. Robinson presented a report outlining the work of the association and opened a discussion of impending legislation by outlining the situation in the Senate and House of Representatives and describing the attitude of various groups toward the railroads. He also emphasized the need for intelligent and combined efforts to combat the attempt of radical groups to bring about government ownership.

In discussing possible action by the next Congress, the activities of those in favor of radical legislation were described and plans for counteracting their effect and putting correct information before the public were outlined. Radical activities in Minnesota and the dangers of their spreading were described by E. D. Luce, receiver of the Electric Short

Line Railway of Minnesota and were attributed to the difficulties of the farmers and their ignorance of the real situation. T. C. Cary of the Christie & Eastern spoke of the tendency in many places for thoughtless merchants and others to use the freight rates as a convenient excuse for all increases in prices and illustrated the good results which follow the education of the people as to the very small part the cost of transportation had in the price of commodities.

The plan of the Nashville, Chattanooga & St. Louis to disseminate railroad information to the public was outlined by Robert S. Henry, director of public relations of that road. He stated that the road does not assume the attitude of defending freight rates but is making an effort to tell the people just how little they amount to, whether on farm products shipped out or on the articles of everyday consumption that they buy. In this attempt the road endeavors to impress upon the people the fact that the only chance for permanently reduced freight rates is lower transportation cost and taxes, which can be brought about only if railroads are allowed to make a reasonable return and not by efforts to cheapen transportation artificially, which will result eventually in poorer service and higher rates.

The Nashville, Chattanooga & St. Louis, to reach farmers in its territory, mails to each rural route boxholder a booklet giving actual examples of freight rates into and out of his own county, which rates are figured on the way the business normally moves into each particular county, whether carload direct, carload to some nearby jobbing center and less-than-carload freight locally and are shown for amounts on retail quantities. Rates on outbound business are shown on the ordinary unit in which the carloads are sold and are calculated to the usual markets to which the products are shipped. This information is also used in a series of advertisements in the local papers to show the insignificant part played by the profits of the railroads in determining prices.

Another method of reaching the people which has been adopted is that of addressing people at county seats. It has been found that many people attend the opening of various courts who otherwise never come to town. Banks and business houses also co-operate in cities and smaller towns by distributing charts to their customers bearing railroad information and also by running such information as advertisements in newspapers. The discussion ended by referring the matter to President Robinson and other officers to work out a program for disseminating information.

The discussion of valuation was opened by Judge E. M. Carr of the Manchester & Oneida, who spoke from the legal standpoint and showed that the courts only were qualified to fix the value of the carriers. Among others who spoke were M. A. Zook of the Montana, Wyoming & Southern, W. L. Seddon of the Macon, Dublin & Savannah and Ben B. Cain, general counsel of the association, who reviewed a few decisions of the Interstate Commerce Commission on valuation.

At the end of the first day's session the association passed a resolution in favor of any sound and well conceived measures of public policy or legislation which will truly and wisely promote the success of agriculture and other productive industries as lying at the foundation of the prosperity of the nation and extending the support of the short lines to any public policy that will bring that result.

At the dinner given by the Traffic Club of Chicago to the American Short Line Association on the evening of October 3, the principal speaker was the Honorable Atlee Pomerene, ex-U. S. Senator of Ohio and member of the Senate Conference Committee which drafted the Transportation Act of 1920, who spoke on the railroad transportation problem. In his address he denounced all political efforts to bring the roads back under federal control and showed the dangers of government ownership and the failure of federal control. He said: "We are hearing a great deal of government control and operation, but 26 months of government operation under federal control should convince any one that it requires practical men to operate railroads just as any other business. It is apparent that with five years more of government operation as was advocated by Mr. McAdoo, there would not have been enough left of the carriers to warrant the appointing of a receiver. Under government operation the number of employees was doubled and wages were raised but rates were not increased so that at the end of the first year there was a deficit of $450,000,000."

He spoke in defense of the Esch-Cummings act, bearing principally upon the rate making section and the Labor Board. In speaking of the valuation of the carriers he stated that upon completion they would show a value of nearly $25,000,000,000 rather than the present tentative figure of the Interstate Commerce Commission. He also spoke favorably of consolidation but stated that it must be voluntary.

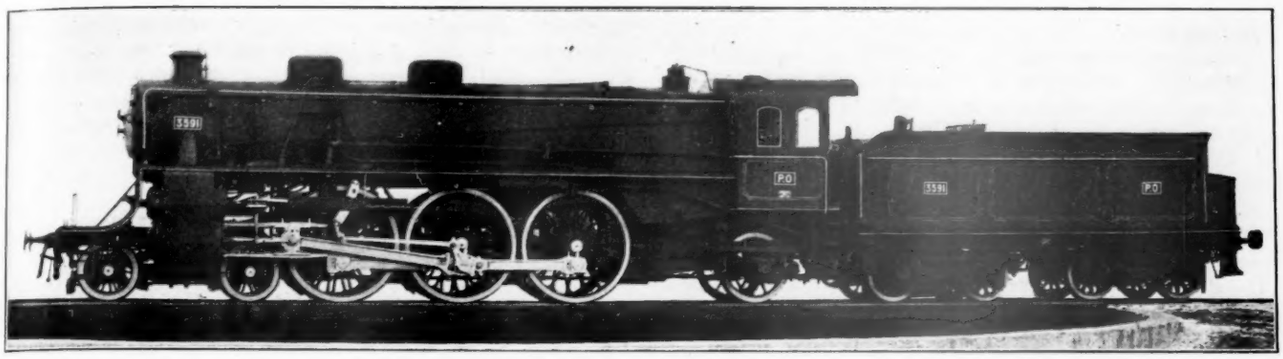
Other speakers were Henry A. Palmer, editor of the Traffic World, who spoke on railroad consolidation, and Captain John W. Gorby, director of public relations of the National Transportation Institute, who spoke on the development of the National Transportation Institute.

On the second day of the convention the per diem charge on freight cars was considered. A committee was appointed to decide the best method to handle the problem, and was instructed to collect data from the short lines for the purpose of drawing up a plan which would satisfy all short line carriers. Following a discussion of the recapture of excess earnings under paragraphs 6 and 9 of Section 15A of the Transportation Act, a motion was passed that the association take no position at present with regard to the recapture clause but support the attempt of carriers to obtain a fair valuation as a basis for the computation of excess earnings by the Interstate Commerce Commission.

In the discussion of consolidation it was stated that Senator Cummings had reported to representatives of the association that he was more determined than ever to bring about unification of transportation systems and was drafting a bill to that effect which he would submit to the short lines, who, he believed, had the greatest interest in consolidation. Ben B. Cain explained the necessity of the short lines being allocated to some group and of their showing a favorable attitude toward consolidation so that the Interstate Commerce Commission would include them, if consolidation were put into effect. He also pointed out that under the plan of consolidation the Interstate Commerce Commission reserved the right to revise the grouping as it found advisable. He also stated that the rate structure for a group would be adjusted so that it would yield a fair return on the valuation of the whole group, and that the revenue for the group would be distributed among the different members of the group so that the division would make it possible for all members of the group to maintain a sound financial condition. No action was taken by the association as a whole, but it was recommended that each member take some definite action at once so that the Interstate Commerce Commission would be aware of its desire to be in some one of the groups. At the request of the Interstate Commerce Commission the Short Line Association is preparing a map of the United States showing all short line railroads.

All officers and directors of the past year were re-elected for the ensuing year.

THE TRAFFIC CLUB of Kansas City is organizing a Traffic Institute which will be open to employees of all firms having members in the club, and to others who will be permitted to join by enrolling through the Kansas City School of Commerce at a higher tuition rate. The institute will be under the direction of practical traffic men and will be self-supporting. G. L. Walker will instruct classes in freight traffic and classification and R. L. Moore, traffic attorney, will instruct classes in the legal phases of transportation and Interstate Commerce Commission rulings.



Fifty American Built Locomotives of this Design are in Service on the Paris-Orleans Railway

American Locomotives a Success in France*

Two-Cylinder Pacific Type with Superheater More Efficient than Compounds on Paris-Orleans Railway

By M. Lunier
Inspector of Equipment, Paris-Orleans Railway

THE PARIS-ORLEANS RAILWAY in 1921 placed in service 50 Pacific type locomotives with simple cylinders and equipped with superheaters. The purchase of these locomotives, which had been deferred until after the summer season of 1920, was decided upon at that time to meet the resumption of express service beginning with the summer of 1921. Because of the quick delivery required, the order was entrusted to the American Locomotive Sales Corporation.

The design was worked up by the engineers of the American Locomotive Company with the collaboration of representatives of the Paris-Orleans Railway, with the object of introducing in the American type the detail arrangements which are standard on the Paris-Orleans line and necessary in view of the operation as organized on this line.

The locomotives, No. 3591 to No. 3640, are of the Pacific type, with 76¾ in. driving wheels, 38¼ in. leading truck wheels and 48¾ in. trailing truck wheels. They are simple expansion with two outside cylinders and use superheated steam.

The boiler is of the straight-top type with the entire firebox of steel plate. The staybolts are of iron and drilled at the two extremities with a ¼ in. hole. The firebox crown is radial and is supported by radial stays, having a ¼ in. hole through their entire length. Flexible staybolts to the number of 515 are applied on the four sides of the firebox, located in the zones where breakage ordinarily occurs. The three front rows of crown stays are flexible.

The fire door is in three sections and opens upward toward the interior of the firebox. This door has been applied since 1907 on powerful locomotives with large grate area on this road. The rectangular grate is of the rocking type, formed of four sections.

The safety valves are two in number, 4½ in. in diameter, and of the Coale type. The water is fed to the boiler by two vertical Nathan No. 10 automatic restarting simple non-lifting injectors. The water enters the boiler at the top near the front tube sheet, the delivery pipes ending in the steam space above plates with tooth edges. The water gage is of the Klinger type with valves which can be operated at a distance.

The throttle is a balanced valve placed in the dome. Under the throttle a water separator is installed, the function of which is to throw back into the boiler before its entrance into the throttle the water which might be carried up in the steam.

The variable exhaust nozzle is of the Nord type. The smokebox is supplied with a basket netting in two parts held by keys, which permit it to be taken down rapidly. The superheater is of the type furnished by the Superheater Company. The damper has been omitted, as has been done for several years on all superheated engines on this road.

The frames are of the American bar type. In the manner of supporting the boiler, spring suspension and equalization, as well as in the design of leading and trailing trucks, American practices also are followed.

The cylinders are lubricated by a Detroit five-feed hydrostatic lubricator. The valve motion is the Walschaert type, with a screw reverse gear. The crossheads, of the Alligator type, are of cast steel. The heads of the main and side rods are of the European type with solid ends and are equipped with an adjusting wedge for taking up the wear.

The automatic air brake is of the Westinghouse type,

PRINCIPAL CHARACTERISTICS OF LOCOMOTIVE

Boiler pressure	171 lb.
Grate area	50.6 sq. ft.
Heating surface, firebox	154 sq. ft.
Heating surface, tubes	2,248 sq. ft.
Total heating surface	2,402 sq. ft.
Superheating surface	775 sq. ft.
Length of tubes between sheets	19 ft. 10½ in.
Tubes, number and diameter	165, 2 in.
Flues, number and diameter	26, 5⅜ in.
Cylinders	24.4 in. by 25.6 in.
Diameter of driving wheels	76¾ in.
Diameter of engine truck wheels	38¼ in.
Diameter of trailing truck wheels	48¾ in.
Driving wheel base	13 ft. 4 in.
Total wheel base of engine	36 ft. 7$\frac{11}{16}$ in.
Weight in working order:	
On drivers	116,500 lb.
On front truck	47,500 lb.
On trailing truck	37,000 lb.
Total engine	201,000 lb.
Tender	120,600 lb.
Tender:	
Water capacity	5,812 gal.
Coal capacity	6.6 tons

*Translated and abstracted from an article in the July, 1923 issue of the French publication, Revue Generale des Chemins de Fer et des Tramways.

operating on all the wheels, with the exception of those on the trailing truck.

The locomotives are equipped with the following apparatus and specialties: A Hausshalter speed indicator and rceorder, a Lambert sander which stands in front of the second pair of drivers, and a hand sander to sand in front of the first pair of drivers; a steam heat apparatus with Mason reducing valves and flexible connections of the Westinghouse type, also a cleaning valve for the smokebox and one for the ash pan.

The accompanying table gives the principal characteristics of the locomotives and tenders.

The stability has been perfect at speeds which have reached 77½ m. p. h. and on runs of 62 m. p. h. average speed. This average speed has been reached at different times without experiencing a "nosing" or vibration any greater than that which is observed on the four-cylinder compound locomotives.

One of the most interesting peculiarities of these Pacifics is the reduction of frictional resistance which they show in relation to compound machines. The chart, Fig. 5,* gives a clear idea of this and shows conclusively the superiority in this respect of the two-cylinder superheater machine over the four-cylinder machine.

In regular service, these machines give the best of results. Their fuel consumption is slightly lower than that of the compound machines used in the same service, as is shown in the following table, which gives the fuel consumption in regular service recorded for compound superheater Pacifics and for the simple expansion superheater Pacifics described. The locomotives chosen for this comparison were in the same state of good repair and had made from the time of coming out of the shop to the beginning of these records, practically the same mileage (25,000 miles). They were in the same service and driven by crews of equal skill. Neither one of the two types was equipped with feedwater heater.

Locomotive No.	Type	Kilometers run	Metric ton, km. engine and train	Fuel consumption kg.	Average consumption per 100 ton km. kg.
3537	Compound	7,809	4,118,439	112,450	2.73
3539	Compound	7,588	4,094,268	112,740	2.75
	Average for the compound locomotives				2.74
3632	Simple	7,939	4,377,974	108,130	2.47
3629	Simple	7,694	4,001,415	110,070	2.75
3638	Simple	8,436	4,515,289	112,070	2.48
3636	Simple	7,981	4,157,723	100,990	2.43
	Average for the simple locomotives				2.53

The allotment of fuel to the enginemen for the two-cylinder locomotives is 5.26 per cent less than that for the four-cylinder compound superheated locomotives.

It should be noted that these locomotives, in which the superheating surface is 775 sq. ft. as compared to 684 sq. ft. for the four-cylinder compound locomotives, operate in general with a temperature of superheated steam at the admission to the cylinders higher than that which can be obtained with the compound.

During the comparative tests made in July and August, 1921, the average temperature of the superheated steam was 642 deg. F. on the simple locomotive and only 556 deg. F. on the compound locomotive for identical trains. This temperature was measured by means of a Fournier pyrometer of the most recent type.

These locomotives require very little maintenance and are greatly appreciated on this account by the engine drivers and master mechanics.

These tests confirm the results obtained by American railroads with two-cylinder Pacific locomotives. This type promises excellent service on French roads. These locomotives are simpler and have a smaller resistance to movement than the four-cylinder compound locomotives. Their maintenance is easier. As to their fuel consumption, it has been less but it may be that they owe this superiority to their higher superheat. At an equal superheat, it would seem that the consumption of these two types of machines would be substantially equal, the theoretical advantage, which their better expansion gives to the compounds, being overcome by the increase in resistance caused by the four cylinders.

*Chart, not reproduced, shows an increased resistance for the compound locomotives ranging from 20 per cent at low speeds to 13 per cent at high speeds.

Traffic League Gives Views on Railroad Legislation

WASHINGTON, D. C.

A COMMITTEE consisting of J. M. Belleville, Pittsburgh, Pa., chairman of the executive committee; R. C. Fulbright, Houston, Texas, chairman of the legislative committee, and Joseph H. Beek, executive secretary, of the National Industrial Traffic League conferred with the President on October 4, and gave him the League's views on railroad legislation.

The committee pointed out to the President that, for the nine months just closed, the railroads have handled the largest volume of tonnage they have ever handled during any corresponding period. Since May 15, the revenue car loadings have been in excess of a million cars per week, except in those weeks which included a nation-wide holiday. Several times in that period the highest carloading records in the history of the railroads have been surpassed.

This record of achievement on the part of the railroads has demonstrated, the committee said, that the transportation facilities of this country are functioning in an efficient manner, and the National Industrial Traffic League will strenuously oppose any legislation of a radical character which would interfere with the continuance of such performance.

The committee expressed the opinion that the Transportation Act of 1920 was, upon the whole, an important and constructive piece of legislation, and that some of its provisions have contributed to the ability of the railroads to achieve the splendid results pointed out. However, the committee expressed the opposition of the League to any legislation looking to the compulsory consolidation of the railroads and to any set plan for arbitrary consolidations in accordance with which future consolidations must be made. The League advocates the elimination of the provisions of the act for the promulgation of a plan for consolidating all of the railroads of the country into a limited number of systems and the substitution therefor of a provision authorizing the Interstate Commerce Commission to approve voluntary consolidations and the terms and conditions governing the same, where they are found to be in the public interest and not to unduly lessen carrier competition.

The committee suggested other changes in the existing law. It was suggested that the law be amended so as to provide that state railroad commissions should have opportunity to pass upon the reasonableness of intrastate rates before they should be increased as the result of orders of the Interstate Commerce Commission; the purpose of this suggestion being to bring about a closer correlation of activities between the state and federal regulatory bodies.

They also advocated the repeal of the so-called recapture clause on the ground that it penalizes prosperity and takes away from the carrier a part of its earnings during prosperous years without making any provision for recouping its losses during lean years.

One of the principal subjects presented related to the Railroad Labor Board. The League has gone on record as advocating the abolition of this board, and the substitution of a federal board of mediation and conciliation with proper provisions giving it authority to consider disputes between all classes of railroad employees and the railroads. The com-

mittee stated that the board, as constituted under the law, is not a disinterested tribunal but is composed of three representatives of the carriers who usually vote in favor of the carriers and three representatives of the employees who usually vote in favor of the employees in matters presented for consideration, leaving to the three remaining members who are representatives of the public, the responsibility of deciding the issues.

The League also opposes the policy of having the government intervene for the purpose of determining the terms and conditions of employment between the railroads and their employees, and the committee said that the Labor Board had not accomplished the good results which its advocates had predicted for it, that it had not prevented strikes, nor had it stopped strikes when they had been started. The League believes that the artificial wage scales maintained by the national body for railroad labor operate to create unrest in labor conditions affecting private industry and that the great inequality between common railroad labor and farm labor thus continued by the Labor Board in defiance of the laws of supply and demand, has been an important factor in creating the serious crisis which has confronted the farmers.

A Plan for Closer Industrial Relations*

How Representatives of Brotherhoods and Management of the Pennsylvania Deal with Each Other

By H. E. Core

General Chairman, Brotherhood of Locomotive Firemen and Enginemen, Eastern Region, Pennsylvania System

INDUSTRY started in this as well as other countries in small units. The employer unit in many cases was a single individual who not only was employer but supervisor, and in many cases a fellow employee; the employee unit was perhaps a single individual. The employer, although a strong individualist, maintained close contact with his employee. That inevitably minimized his own individualistic obsessions, and permitted him to secure a first-hand conception of the rights, needs and desires of each of his own employees.

As industry expanded, a very material evolution in the status of the two groups occurred. The employer group expanded to such a point that today it is largely an absentee group, having no contact whatever with the employees. The employee group has expanded so that it no longer has direct personal contact with the employer. There is now a third group in the industrial situation that did not exist even a generation ago; that is the group of supervising employees. As an illustration, on the Pennsylvania today, the employer group constitutes some 230,000 individuals. The employee group constitutes some 220,000 individuals. The supervising employee group constitutes some 15,000 individuals.

This enlargement of the several groups in industry inevitably brought about a loss of contact between employer and employee, which has reached a stage where all too large a proportion of each group are strangers to each other. Now, ignorance is the great cause of suspicion. It is not the known that is terrible, it is always the unknown. Did you ever hear of ghosts appearing in the daytime? They always appear at night, because daylight discloses their non-existence. That is knowledge. It is not our friends and close acquaintances of whom we are suspicious; it is strangers. That is the basis of much of the trouble in industry today. The employer is a stranger to his supervising employee; he is a stranger to his supervised employee; the supervising employee is a stranger to many of the supervised employees.

Only by better acquaintance can a recognition of our mutual responsibilities be re-established. That does not in any way entail either social or political companionship. But certainly not the least important companionship today is industrial. The closer the industrial companionship or relationship between these three great groups, the more efficient the organization. The better acquainted each group is with the other—with the rights, needs, desires and limitations of the several individuals—the more considerate will each group be of the rights and needs of the others. One of the great defects of industry today is not that it is inhuman, but that it is unhuman. One of the great needs is to humanize industry, to deal with individuals, not as cogs in a vast machine, but as human beings whose reserve, initiative and individuality are infinitely more valuable than the routine of a corps.

Fundamentals of Pennsylvania Plan

One of the present-day attempts to solve this somewhat perplexing and infinitely complex problem is now taking place on the Pennsylvania. It is not an Atterbury plan. It is not an employee-representative plan. It is a Pennsylvania plan; it is a co-operative plan. It started nearly 10 years ago, in the offer of one of the general chairmen in the transportation organizations to the then general manager of the Lines East, Mr. Long, of a proposition to meet monthly and try to settle our differences. Such differences as could not be settled across the table were to be referred to a board of arbitration to be selected, one by the management and one by the employees, they to select a third, who were to sit one day each month and decide such questions as we had not been able to settle. That was rejected.

Up to 1918 there was more or less agitation on this question. The duties and responsibilities of the general manager had become too great for any single individual. We had reached a time when it was often as long as a hundred days before we could get a meeting with the general manager, maybe another hundred days before we could get his answer on grievances. You know that delayed justice is often denied justice.

That led the four chairmen of the transportation organizations to present a proposal in 1918 for monthly meetings to settle our differences across the board. In neither of these cases was the plan at all as comprehensive as the one adopted. I am not at all sure that it was not a fortunate thing that neither was accepted, because in both cases they were incomplete and compromise propositions.

Mr. Atterbury, I judge, coming back from the world war, had a somewhat fresher view than those immediately on the ground. I recall at one of our early meetings a striking statement of his, which I feel is one of the underlying thoughts in our plan. He said: "If two friends sit down together and have all the facts before them on any case, they ought not to have any difficulty in arriving at a common judgment."

The other great basis of our plan is that if two parties make an agreement, neither has the sole right of deciding

*From an address before the New York Railroad Club on September 21, 1923.

what it means. This plan is a recognition that the two parties who make these agreements have an equal right to decide what they intended by them. Our plan also aims at the elimination of delay.

How the Plan Operates

The new plan comprehends, first, a meeting between the local chairman and the superintendent on each division once each month on a day set in advance so that both sides know it, a date which cannot be changed except by mutual consent. Either the superintendent or the employees' representative may present matters for discussion at that meeting, the only limitation being that they must be presented to the other party at least five days before the meeting. If the superintendent and the local chairman agree, that settles the matter. If they disagree, the case is reduced to a joint submission, which consists, first of the subject matter; second, what both sides mutually agree are relevant facts with reference to the case; third, the position of the local chairman, and fourth, the position of the superintendent. Our plan also calls for a meeting each month between the general chairmen and the general superintendents, between the general chairman and the general manager, and also our court of review meeting.

These meetings are consecutive, spaced far enough apart so that a disagreement between the local chairman and the superintendent can be referred to the general superintendent, allowing the necessary five days, and in case of a disagreement there, can be referred to the general manager the necessary five days in advance, and in case of disagreement with the general manager, can be referred to the reviewing committee five days in advance. This makes a cycle which is complete in not to exceed 60 days, and ordinarily in the 30-day period.

The general chairman, on receipt of such a joint submission from his local chairman, considers whether or not the local chairman is justified in the position he has taken. If he decides that the local chairman is not justified, he declines to handle the case. If he decides that the local chairman is justified in his position, he refers the matter to the general superintendent and it is discussed at the regular monthly meeting with the general superintendent. In case the general superintendent and general chairman disagree, that disagreement is reduced to a joint submission in the same manner as the original joint submission. It, in turn, is referred to the general manager, and in case at the monthly meeting with the general manager, they disagree, such disagreement is again reduced to a joint submission and referred to the reviewing committee. In case no decision is reached at the first monthly meeting, the case is carried over to the second monthly meeting, and in case no decision is reached then, the committee shall decide what further steps shall be taken to dispose of the case.

In the only disputed case, it was referred to a board of arbitration, which very promptly made the decision.

There is a good bit of human psychology back of our reviewing committee. First, it is based on the thought that the two parties to the agreement have equal right to interpretation. This really is a quasi-judicial body which has the power of interpretation because it decides in case of dispute what our various working rules mean as applied to the several concrete cases which are presented to it. The members of the reviewing committee are sixteen in number, eight from each side.

This plan was formulated at a meeting between the general chairmen of the four transportation organizations and the several general managers of the system, at the initiative of Vice-President Atterbury in December, 1920, becoming effective January 1, 1921. The question immediately arose as to the best form of making decisions of the reviewing committee. Ought we to make all decisions unanimous? Immediately there was the objection that any man could block a settlement on any question. That manifestly was unjust to both sides. Should a majority vote decide? The objection to that was that if a majority voted and the division was at all along partisan lines, it would place the onus of any decision on a single individual of the minority group. If he were an employee particularly, there would be insinuations of improper coercion. We finally decided on a two-thirds vote and the longer we sit the more we feel that our judgment was sound. If there is a division along partisan lines, the majority group must convince at least three members of the other group before a decision can be reached. It is manifestly impossible for anybody to coerce almost half of such a unit.

We have handled almost 800 cases and have made a decision on every case except one. The reason why we did not reach a decision on that was to save the feelings of one of the older members of the employee group.

When you stop to think that one of the most vexatious things in the contact between employer and employee on the railroads is the question of discipline, that is an amazing record. We handled dozens of discipline cases and yet we have not had one that we have not settled. Where formerly an important matter was in dispute for anywhere from a year and a half to two years, it is now settled in from 30 to 60 days. The individual or group of individuals aggrieved on any particular question is not aggrieved long enough to be at all irritated before a decision is reached.

I do not present this as the only plan. There are an infinite number of plans. But every day it is bringing a clearer recognition to both the employees and the supervising employees, who are representing the management, of their mutual or co-operative responsibility, because we are handling questions that vitally involve many of the functions of the management. In discipline cases, we are digging deep into the solidarity of the organization as a transportation machine. The handling of the employee questions in this intimate manner brings closely to the representatives of the management many of the desires of the employees in a way that they could not get in any other manner.

A Prediction

One of the most vexatious questions that the employees have to handle is that of seniority, the rights to runs. A few years ago the dispute between ourselves and the management over these questions were much more irritating even than our discipline questions. About seven years ago the management concluded it would get rid of that vexatious matter and in so many words they said to the transportation organizations, "Gentlemen, this is your trouble, settle it"; and turned over bodily all questions of seniority and rights to runs.

I do not know of a shrewder move any railroad company has ever made. It immediately got rid of a very vexatious question and the employees have had it ever since. We recognize our responsibility as a component part of the Pennsylvania personnel, in settling our own employee troubles.

I am going to make a prediction that on the Pennsylvania and, I believe, on many more railroads within the next two decades, the same thing will largely occur on matters of discipline. Now, that is quite a radical statement. But the recognition of responsibility on the part of employees individually, collectively and representatively, has advanced so in the last 10 years, as well as recognition on the part of the management that employees, when given responsibilities that they should assume, conscientiously assume them, that I believe matters of discipline within the next few decades will be left almost entirely to the employees. Infractions of rules are matters just as vital to each and every employee as to the management, because no employee can infringe the rules without injuriously affecting the safety and comfort or well-being of his fellow employees. It is not coming in a day or two; it is a matter of education. But I believe it will come.

Transportation—the Master Key to Progress*

General Prosperity Will Follow if Railroads Are Properly Encouraged to Improve Their Service

By Edward J. Kearney
President, National Machine Tool Builders' Association

MACHINE TOOLS are called, and rightly so, the "master tools of industry;" but they are not a primary product, creating their own demand, or connected, except very indirectly, with individual consumption. It is not known among businessmen generally that the machine tool industry suffers during the downward swing of the business cycle to a far greater extent than ordinary manufacturing lines, for the reason that our product is bought mainly during periods of expansion. The carpet-sweeper manufacturer, when his business shrinks 5 per cent, buys no more machine tools, so that our business, as far as he is concerned, falls 100 per cent. The example could be extended almost indefinitely. If we were sufficiently numerous to be of importance in our national elections, attempts would long ago have been made to capitalize our distress at the polls. Is it therefore any wonder that we are asking one another whenever we get together by two's and three's, "What is the next development that will sustain the machine tool industry?" Every one has an answer. I have mine. It is general, mechanical, industrial, and agricultural development and prosperity, with *transportation the master key to progress.* Unfortunately there are certain elements in our political life that would throw the key into the well and prevent entrance into that temple of well-being—"universal prosperity."

Future progress depends on adequate transportation facilities. So important is this that it should be a matter of the most serious concern of every businessman and citizen. It is this view that leads me to present an outline of the case and show where we can do something for ourselves and in the public interest.

There are few people not actively connected with railways or who have not made a study of their growth, who have any idea as to the enormous extent to which transportation in this country has grown, or to where it will lead with the present rate of growth continued. This is why we should be concerned.

Passenger Traffic

It seems to be a part of our national genius to travel. This is due in part to the prosperity of our people, and in part to our universal educational system which carries with it the desire to see other sections of our country and other lands. For example, the Iowa farmer, when the corn crop is good and hogs are high, spends the winter at Long Beach, California. The Colorado school teacher spends her vacation attending summer school at Columbia University. The Ohio business man goes South for a late and an early game of golf, and all of the newly-weds see Niagara.

In addition to this, the system of marketing our products has brought about extensive travel on the part of representatives of manufacturing concerns, wholesalers, and others, so that railway travel, in spite of the coming of the automobile, is growing rapidly. In 1880 the per capita travel was approximately 100 miles, which has continued to grow steadily during each decade until it is now about 400. These figures show their true comparison when it is recollected that the population of the United States in 1880 was only 50,000,000, meaning that the number of passenger miles traveled at the present time is over eight times what it was in 1880.

Freight Traffic

When we come to the study of the subject of freight, we find a similar condition with the difference that the rate of increase is much more rapid. The per capita ton-miles rising steadily during the period, multiplied itself about six to one. In 1880 the number of tons of freight hauled one mile was 32 billion while it is estimated that for the year 1923 it will be beyond 415 billion or 13 times as much.

Some investigators are of the opinion that the length of haul will diminish, owing to the tendency to establish factories in other than the strictly industrial sections and nearer to the point of consumption. This would have the effect of keeping down the ton-miles as compared with the number of cars loaded. But, on the other hand, the motor truck on hard roads is taking away many of the short hauls, tending again to lengthen the average haul. At the present time the product of the mine, the forest, and the farm furnishes 70 per cent of all the freight, and none of these can be moved. State traffic furnishes but 15 per cent of the whole, while interstate traffic furnishes 85 per cent. In this discussion passenger traffic would be eliminated if it were possible, but people will and must travel, and the high speed, preference trains furnished for their accommodation clutter up the tracks, increase the time and cost of getting slower-footed freight over the road, and consequently increase the number of freight cars and locomotives necessary for a given volume.

Future Transportation Requirements

Every factor in the economic progress of our country points to greater production, greater wealth, and higher standards of living; consequently, greater consumption, necessitating more and better tranportation. There are ample grounds for the prediction that within 20 years we shall demand of the railroads the moving of twice the amount of freight carried today, or more than 800 billion ton-miles. In addition, they will be called on to provide for a 75 per cent increase in the passenger miles traveled. Given the vitalizing power of sustained credit, without which nothing can be done, is it a task capable of accomplishment? Will it be possible in this space of time to provide facilities to dispose of this overwhelming volume? Are there any improvements in sight that, if applied, will help to a solution?

Tour of Inspection

For the purpose of bringing the answer to you, a tour of inspection was taken by me last month, railway officials and workmen interviewed, engineers connected with railway supply and manufacturing concerns questioned, and other sources of information consulted, resulting in the accumulation of data many times the amount that it is possible to present here.

One-third of the way back to the beginning of railways, your President was engaged through the greater part of seven years in supplying fuel to the small but hungry furnaces of the locomotives of that day. Since then, while he has de-

*From an address before the National Machine Tool Builders' Association, at Lenox, Mass., October 3, 1923.

pended for his livelihood on the design and manufacture of machine tools, interest has not been lost in the development of railway appliances and their application to the growing needs of the country. Interest in railway development has, however, not taken the form of active contact so that it will be 30 years next month since last standing on the deck of a moving locomotive. It is easy, under such circumstances, to imagine the thrill received from a ride taken a few days ago on a modern freight locomotive many times the size, and burning only about one-half the coal per unit of useful work of its predecessors of 30 years ago. The comparison also applies to many of its contemporaries as far as fuel consumption is concerned.

Throughout the years of railroad building, when attention was principally given to the extension of lines and territorial development, locomotives changed mainly in size, the general construction remaining about the same. Each decade saw larger and larger locomotives in use, but all embodying approximately the same principles and methods of steam-making and distribution as were employed in the eight-wheelers of the sixties.

Super-Heating

Investigation shows that improvements have now been made greatly increasing the economy and power of the steam locomotive. This has been brought about by adding new principles, such, for example, as superheating, which means that the temperature of the steam is raised above the temperature which it normally has when in contact with the water from which it is made, the additional heat added being entirely a gain in economy.

The increase in efficiency, due to the use of super-heating, means less fuel consumption for a given output of work, or an increased output of work with the same fuel consumption. This increase varies according to the conditions, and, at the higher speeds at which freight locomotives are operated, say from 20 to 40 miles per hour, amounts to as much as 33 per cent increase in draw-bar pull. This improvement has been applied to about 50 per cent of the locomotives now in use.

Feed Water Heaters

It may seem strange that such a simple device as a feed water heater, which has been used in stationary practice so long, has not been generally applied to locomotives. It must be remembered that the locomotive is limited to the width of the track upon which it runs, which cannot be made wider, and to the height and width of bridges and tunnels. Within this space everything that is to be attached to a locomotive must be placed, and it has taxed designers to the utmost to provide these extra devices within the limits allowed, and at the same time make them of sufficient simplicity to remain absolutely reliable in service and not too costly to maintain. Hard water may cause trouble and make the heater a nuisance. The facts are that there are comparatively few feed water heaters in use on American locomotives. As now used on some of the locomotives built within the last three years, it has the effect of adding over 15 per cent to the draw-bar pull at speeds ranging from 20 to 40 miles per hour. This device is now applied to less than 1 per cent of the locomotives of the country, but will become universal.

Water Rectification

Mention has just been made of the difficulties that might be encountered in feed water heaters by the use of hard water. This is as a mere nothing to the trouble it makes inside the boiler. Hard water for steam-making purposes is not only detrimental to economy but is a positive block to regularity of service, especially in the winter, when maximum steaming is required on account of adverse track conditions.

Fortunately all water is not hard, but there are many sections where it is. In some sections where the water is not the best, it can be used by adding chemicals to prevent the forming of hard scale. With this system, frequent boiler washings are necessary. Some waters, especially in the West, are wholly unfit for steam-making purposes until after they are treated in water rectification plants. Steamships use sea water to condense the steam, which is returned to the boilers and used over and over again. Locomotives must use whatever kind of water they find at convenient points on the line. Proper treatment is vital to economy and reliability of service.

Increasing the Heating Surface of Fire Box

Thermo-syphon fire-box equipment, employed on a few locomotives, consists of large tubes which spread out into a fan-shaped structure connecting the crown sheet with the lower front part of the fire-box. Its effect is greatly to increase the circulation through and around the fire-box and over the crown sheet, the hottest part of the locomotive boiler, and therefore greatly increase steaming capacity. About 15 per cent can be added to the draw-bar pull at normal speeds by the use of this device. This also provides a support for brick arches which are now applied to 75 per cent of the locomotives in use.

The devices mentioned thus far are all for steam-making. By their combined use, either on new or old locomotives modernized, about 80 per cent more volume of steam can be produced with a given size boiler with the same amount of fuel consumption, which means that a 3,000-ton train can be increased to beyond 5,000 tons on the open road and proper speed maintained.

This picture is somewhat dimmed by the fact that these devices are of little or no value in starting the train, which requires a draw-bar pull of about 18 pounds per ton, whereas only about seven pounds per ton are required to keep it rolling when once started on straight and level track. Nor are they of any special use on the grade when the speed is reduced to near the stalling point, except on locomotives especially designed for heavy grades and low speed. Such locomotives are not adapted for service on the open road where relatively high speeds must be maintained to economize time and prevent congestion.

The Booster

In order to enable the locomotive with its improved steam-making devices to get its enlarged train started and over the stalling grades, a mechanism had been applied called, in railroad parlance, a "booster." This is the newest development, and has been applied to only a comparatively few locomotives, but quite sufficient to prove its value. In order to understand better its application and usefulness, it will be necessary to consider briefly the principle of locomotive wheel arrangement for different kinds of service.

At low speeds the greatest tractive effort is exerted, but owing to the low piston speed, less steam is needed; therefore, the switching locomotive has a comparatively small boiler and all the weight is carried on the drivers. The same principle applies to the so-called Mallet type, designed for mountain grades, where double sets of drivers and cylinders are placed under one boiler. Neither of these types is suitable for high speeds, as their boilers would not furnish a sufficient supply of steam.

In heavy passenger and fast freight service, the conditions are exactly reversed. The steam requirements go up with the speed, and the tractive effort goes down; consequently, large boilers are used and the weight carried in part on truck wheels, both front and rear. The rear set of wheels are called trailers and are smaller than the drivers in order to find accommodation under the fire-box, which places a limit to the rearward extension of the drivers. When the train is being started, or is running on grades or sharp curves

at very low speeds, then all of the tractive effort possible is needed. Under such circumstances there is a surplus of steam. These are conditions where the booster comes in. It is a double cylinder steam engine, spur geared to the trailing wheels at a ratio of three or four to one, by means of shifting gears, which automatically disengage when not wanted, leaving the trailing wheels to run free. Its action, when engaged, is very much like an automobile running in low to pull itself out of the mud. About 25 per cent is added to the draw-bar pull at speeds under 12 miles per hour on a locomotive with eight drivers coupled, providing that the trailers carry the same weight as each pair of driving wheels. The effect of the booster is to start a longer train with less shock due to slack taking, and take it over a steeper grade without stalling.

Electrification

All the world loves a contest, as the gate receipts at recent fistic encounters amply testify. That is why we are thrilled by seeing a notice in the daily press of a contest between a steam and an electric locomotive. The two were coupled together and speeded up to 60 miles an hour by the steam locomotive. The current was then turned on, the steam locomotive continuing to do its best while the electric locomotive exerted its power in the opposite direction. The two were not only brought to rest, but the steam locomotive was entirely overcome and pushed rapidly backward by its new rival.

The electrification of railways fascinates the popular mind, and for this there is ample justification.

Improvements in steam locomotive, such as we have been considering, postpone the day of its extinction into the distant future, if, in fact, it ever takes place. Both the electric and the steam locomotive are sure to have a huge part in speeding the mighty stream of traffic that flows in an ever increasing flood from state to state and onward to the sea. The use of electric locomotives will increase, for a very good and simple reason. It takes six or seven times as much draw-bar pull to take a train over a 2 per cent grade, as it takes to move it on the level. If the train is to go through unbroken, it requires double and triple heading, pushing and double pushing. With all this extra power, the speed is reduced to a crawl, congesting the line at a point where double tracking or quadruple tracking is liable to prove difficult and expensive, as these are the points where tunnels and other obstructions are most likely to be found.

With electricity, power without limit can be concentrated, train speeds maintained, and the heavy grades cease to be a limiting factor on the line. Many other things can be said in favor of the electric locomotive, such, for example, as its ability to stay in service and make long runs. Its one drawback is cost of installation, which is many times more than is required for steam; so that at present, and perhaps for many years to come, it will best justify itself on mountain grades, tunnels, and terminals.

Sidings, Switch and Signals

Improvements in the capacity and economy of the power is of comparatively little avail unless there are also corresponding improvements in other portions of the whole mechanism of the railroad. Long, heavy trains can not be sent over single or double track lines unless sidings are supplied in sufficient quantity and size to take care of them, and provision made for their speedy operation.

Thousands of miles of railway are without block signals. These were first introduced purely as a safety device but have now become necessary for the expedition of traffic over congested lines. In the pioneer days, when trains were few and small, there was no great loss if the train came to a full stop when taking the siding, giving the brakeman opportunity to run ahead and turn the switch, and for the train to pull into the siding and move out again after the meeting had been made, making a third stop for the brakeman to close the switch and catch the rear end of the train. But when it is a congested line with 5,000 tons of freight and a modern power unit, it becomes a matter of very great importance and can only be handled to the best advantage as regards economy, expedition, and safety, by interlocking switches and signals in control of an operator near the siding or several miles from it. In other words, the time is at hand when trunk-line railways must cease hand operation and adopt machine operation for economy and quantity, sending trains from one track to another, or in and out of sidings by the push of a button in place of the slow methods of the past.

Brakes

The layman ordinarily thinks of air brakes as something that was invented and completely perfected a half century or more ago. The service rendered to the safety of the railways throughout its life has been of the greatest value, but this has only been accomplished through continued improvement. There are new improvements made that can be applied when the proper time comes, for the further effectiveness of the service on very long trains. The brakes take effect progressively from the head to the rear end of the train. Their action is so slow, both for setting and releasing, that it is impossible to apply them on a long train of from 75 to 100 cars, without bringing it to a full stop, unless the train is running at a speed greater than ten miles per hour.

In the New York subway, ten-car passenger trains are operated at extremely short intervals, the trains being equipped with electro-pneumatic brakes, so that the brakes are set and released simultaneously and instantly on each car as though it were a single unit by itself. Electric control of air brakes will certainly be a requirement of the future. I am aware that conditions are not ready for the general application of electro-pneumatic brakes at present, and that is why it is spoken of as a requirement of the future.

On freight cars the power of the brakes can only be adjusted to the empty car, when the car loaded may weigh three or four times as much. This means that where loaded cars and empty cars are in the same train, the braking capacity on the empties is three or four times as much as it is on the loaded cars, with consequent shock and damage creating a limiting factor on this type of service. Improved brakes have been designed and applied to a small extent to meet these conditions.

These are only a few of the outstanding improvements that are possible of being applied to the task of greater and more economic transportation.

Developments in operation will lead to the placing of Chicago, Pittsburgh, Kansas City, and other restricted gateways on stub tracks, the main line passing them by.

Keeping the Equipment in Service

One of the greatest economies in railway operation is to keep the equipment in use the greatest possible amount of time. In our own business we recognize the value in reduced overhead when our equipment can be used full time, or better still with more than one shift. The same is true of railway equipment. In order to bring this about, there must be facilities for taking care of locomotives at the terminals so that they will be the least possible time out of service. This means better and larger round-house facilities, sanding and coaling devices, boiler washing equipment, and last, but certainly not least, modern machine tools for both the round-house shop where temporary and emergency repairs are made, and for the general shop where thorough overhauling is done.

Is Management Incompetent?

It has been shown that there are improvements in equipment actually tested and to a limited extent in use to warrant

the conclusion that there are no engineering obstacles to more, better, and relatively cheaper transportation. Reference is frequently made in certain quarters to the incompetency of railroad management. Let us see as to that. Since taking back the roads from the government on March 1, 1920, the number of employees has been reduced by 150,000, while the amount of traffic being moved at the present moment is the largest in history, with a steadily rising car surplus for the October peak.

This hardly looks like incompetence.

The only thing that stands in the way of growth of transportation facilities is lack of capital. No arguments are necessary to convince you that the capital will be forthcoming if there is prospect of security for the investment and a continued return satisfactory compared with what can be obtained in other industries. The selling methods of our political leaders have not improved as rapidly as have those of the makers of some less important commodities, with the result that the people are misinformed and led to believe false economic doctrines. When any considerable class is adversely affected, such for example, as the wheat growers or the coal consumers, what is the first suggestion for relief? Take it out of the railroads.

Commission Has Double Responsibility

In the Transportation Act of 1920, Congress places the regulation of the railroads in the hands of the Interstate Commerce Commission with instructions to see that no injustice is done any shipper; also charges them with an equally important duty of seeing that the railroads receive a return, which will attract capital sufficient for adequate growth and development.

Mechanically the railroads are on the way to handle the ever-increasing volume of traffic and to do it so much more economically as to give promise of ultimate freight rate reductions. Our opportunity is in using our influence with those in authority to promote and maintain a government policy favorable to the development of transportation, the master key to progress. Vital to mechanical progress by the railway is the investment of vast capital. Underlying such investment is confidence in the stability of railway income. Behind this in turn is stability of government policy. Efforts are being made to repeal the act or so to amend it that the revival of railroad credit will be impossible and public interest suffer irreparable damage. Some men in public life do not seem to know that one dry bearing will be just as disastrous to the operation of the whole machine as if no oil were used at any point. The immediate objective is a further trial of the Transportation Act without experimental amendments. In future years the objective is so to guide the progress of perfecting the law that always embedded in it will remain the principle of net income adequate for the attraction of investment capital.

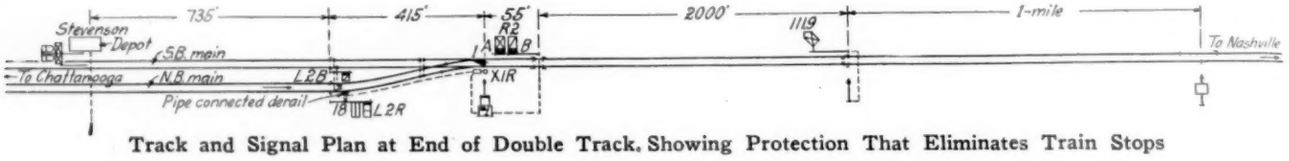
Can you not picture a shrinking map with the Missouri valley products only 48 hours from Atlantic harbors? Can you not visualize with the prosperity incident to these developments an enormous increase in the use of mechanical equipment on the farm, in the home, on the railway, in the air—wherever there are tasks for human hands to perform? Does this not mean that the manufacture of machine tools will become a more stabilized industry depending less on the activities of any one line and more on the general prosperity of all the people?

Eliminating 4,380 Train Stops

By G. S. Pflasterer

Signal Engineer, Nashville, Chattanooga & St. Louis, Nashville, Tenn.

A DISTANT CONTROL, low-voltage switch machine with signal protection has been installed recently at the end of double track at Stevenson, Ala., on the Nashville, Chattanooga & St. Louis. It is estimated that the elimination of 4,380 train stops a year, as afforded by this installation, will introduce a net saving of $8,894 a year or at the rate of 141 per cent on the investment of $6,277. The installation as shown in the illustration consists of an electric switch machine for the operation of the switch and the derail, three high signals and a dwarf for controlling train movements, and two small interlocked circuit controllers in the block office which is 1,150 ft. from the switch.



Track and Signal Plan at End of Double Track, Showing Protection That Eliminates Train Stops

As this switch is the junction of double track from the south with single track on the north, it was formerly necessary that all approaching trains be brought to a stop. However, with the new signaling installation the switch is set and the signals cleared electrically by the operator in the block office. The control is effected by two small interlocked circuit controllers, interlocked between each other for the operation of the switch and signals respectively. The Hayes derail at the clearance point on the turn-out lead is pipe-connected to, and operated by, the same machine that operates the switch, thus saving an extra machine. Route and detector electric locking is employed with a clock-work time release. An annunciator, announcing the arrival of trains on the single track, is controlled for a distance of one mile to the rear of the distant signal.

The Switch and Derail are Operated by One Machine

The complete installation cost approximately $6,277 and the railway anticipates a saving of 141 per cent on the investment on account of the following advantages:

Elimination of 4,380 stops per year,	
740 hours saved per year,	
1,750 tons coal saved per year,	
Total money value of savings per year	$9,466
Deduct for maintenance and interest per year	552
Net savings per year	$8,894

Ralph Peters Dies Suddenly

RALPH PETERS, president of the Long Island Railroad since 1905, died suddenly on October 9, at his home in Garden City, L. I., from heart trouble. Mr. Peters had not been in good health for the past year and had been gradually lessening his activities preparatory to his retirement on his seventieth birthday, which would have occurred on November 19, next.

Mr. Peters came to the Long Island in 1905, after having already served the Pennsylvania System for a period of approximately 30 years. He was the Long Island's twentieth president and served longer in that position than any of his predecessors.

The growth of the Long Island in the 18 years during which Mr. Peters guided the activities of that road is one of the most remarkable developments of its kind in American railway history. It was made possible, of course, not by the Long Island's own earning power but by the financial strength and foresightedness of the parent Pennsylvania Railroad, which acquired control of the Long Island by purchase of a majority stock interest in 1900. To Mr. Peters, however, must be given the credit for being the man who presumably had the most to do with guiding Long Island activities during the period of development and in securing the degree of success which has resulted therefrom. When he became president, in 1905, the Long Island road was one of secondary importance, looked upon more than anything else as a road patronized chiefly by summer excursionists. At that time it had no real entrance into Manhattan. Its terminus was at Long Island City, from which it operated ferry boats across the East River to Thirty-fourth street, Manhattan.

Ralph Peters

In 1905, the first year in which Mr. Peters served as president, the road carried 18,000,000 passengers and 69,000,000 revenue ton-miles of freight, and its gross revenues were not quite $8,000,000. The Long Island at present has grown sufficiently so that it is now numbered among the $25,000,000 roads. Its gross revenues in 1922 were $31,000,000; the number of passengers carried 80,000,000, several times as many as in 1905, and its ton-miles 135,000,000, or approximately twice as much as in 1905. This growth in the Long Island's business was made possible by the enormous sums which the Pennsylvania put into the property, notably in the form of rehabilitation of the Long Island lines, elimination of grade crossings, building of new stations, electrification of approximately one-fifth of the mileage and, perhaps, most important of all, the giving of access for the Long Island trains to the big Pennsylvania station in New York by means of tunnels under the East River; and all at a nominal rental. The Long Island is the largest carrier of commutation passenger business into New York City, and each year shows a substantial increase in the number of passengers carried as the remarkable development of the Long Island suburban territory progresses.

While it is true that the greater part of the Long Island's development has been in passenger business, the road has also seen a great development industrially. Mr. Peters, throughout his presidency, was particularly interested in agricultural development, and he devoted a great amount of attention to the exploitation of the agricultural resources of the island. A step of particular importance in this connection was the establishment of experimental farms on the scrub-oak and other waste lands. Large areas of hitherto idle and non-productive tracts were brought under cultivation. This activity resulted in an increased tonnage of farm products for the railroad; this development also aided the further development of the suburban area for commutation business.

As a railroad officer Mr. Peters' activity was not confined to Long Island. He served from 1912 on as chairman of the Committee on Railway Mail Pay, the organization by which the railroads of the country carried on their strenuous campaign against inadequate governmental appropriations for transportation of mails. The committee was established in 1909, and Mr. Peters was made a member, becoming chairman, as already noted, in 1912. The committee made a detailed study of the mail pay situation and conducted the case before the Interstate Commerce Commission which was decided in the railroads' favor in 1919.

Ralph Peters was born at Atlanta, Ga., on November 19, 1853. He was the son of Richard Peters, one of the pioneer railroad builders of the South. Ralph Peters was educated in private schools in Atlanta and Baltimore, and was graduated from the University of Georgia in 1872. Immediately after his graduation he became associated with the Atlanta Street Railways, and for two years was superintendent and purchasing agent. In August, 1874, he became associated with Samuel M. Felton, Jr., when the latter was appointed general superintendent of the Pittsburgh, Cincinnati & St. Louis, now a part of the Pennsylvania. He served as chief clerk until February, 1881, when he was appointed superintendent of the Logansport Division of the Pan Handle, including the Chicago terminals. In June of the same year he was transferred to the superintendency of the Little Miami division of the same road with headquarters at Cincinnati. This position he held for 20 years. Among the other positions which he held was that of superintendent of the Newport & Cincinnati Bridge Company; vice-president and finally president of the Cincinnati, Georgetown & Portsmouth. In 1901, he was made general superintendent of the Southwest System of the Pennsylvania Lines West of Pittsburgh, with office at Columbus, Ohio. This position he held until his election to the position of president and general manager of the Long Island in April, 1905.

General News Department

The Department of Transportation of the University of Illinois has added a course in foreign railroads to its curriculum. The Transportation department has been built up in three years from a single course to one of eight courses with four members on the instruction staff and an enrollment of 500 students. The new course deals with European railroad systems, principally those of France, Great Britain and Germany and the Canadian railroads.

The Denver & Rio Grande Western has applied to the Colorado Public Service Commission for permission to abandon its Blue River and Calumet branches. The former consists of 36 miles of narrow-gage track between Leadville, Colo., and Dillon. It has not been in use for a number of years because of the exhaustion of ore bodies and the discontinuance of mining operations in that region. The Calumet branch is a narrow-gage line extending from Hecla Junction seven miles east to the Calumet mines.

A handsome silk banner has been awarded to the employees of the Savannah Shops of the Atlantic Coast Line in recognition of the safety record made in those shops during a period of three months in which there was only one personal injury that caused a loss of time of more than three days. Master Mechanic J. W. Reams and members of the Shop Safety Committee occupy the center of a picture taken at these shops on September 19, which appears on another page of the *Railway Age*. The total number of employees in these shops is 554. Robert Scott, chairman of the General Safety Committee, gives credit for this excellent record to Mr. Reams and his assistants, and to the members of the local safety committee. On the Atlantic Coast Line as a whole there are 28 safety committees on which serve 350 members.

Railway Returns by Districts

The net railway operating income of the Class I railroads by districts for the first eight months of this year, with the percentage of return based on the property investment account in each district has been as follows:

		Per cent
New England district	$10,737,168	1.82
Great Lakes district	138,186,494	6.18
Ohio-Ind.-Alleg. district	157,759,118	5.70
Pocahontas district	33,261,874	6.09
Southern district	86,577,819	5.37
Northwestern district	52,665,096	2.79
Central Western district	103,690,086	4.34
Southwestern district	42,757,257	3.60

Naturalized Foreigners on the Pennsylvania

Of the 28,665 foreign-born employees on the Pennsylvania Railroad System, 20,949, or 73 per cent, have either become naturalized American citizens, or have taken out their first papers. The company's Americanization work, inaugurated on the eastern lines ten years ago, is now being carried on all over the system. Last year, in the Eastern Region alone, 993 foreign-born employees were fully naturalized. Since the Americanization campaign was renewed in the Northwestern Region this spring, 513 foreign-born employees, representing 28 different nationalities, have applied for naturalization papers, and 1,086 have been interviewed on the subject and offered assistance by the company's representatives. In conjunction with its Americanization work, the railroad company provides free correspondence courses, and local classes of instruction in the English language. In addition, the men are encouraged as far as possible to attend night sessions in the public schools. Over 5,000 employees have taken advantage of the Railroad's educational courses. Forty-seven nationalities are represented in the foreign-born employees on the Pennsylvania.

Car Inspectors and Car Foremen Elect Officers

The Chief Interchange Car Inspectors' and Car Foreman's Association, in convention at the Hotel Sherman, Chicago, as reported on page 642 of the October 6 issue of the *Railway Age*, elected the following officers for 1924: President, W. Westall, special inspector, N. Y. C., Cleveland, Ohio; first vice-president, C. M. Hitch, district master car builder, B. & O., Cincinnati, Ohio; second vice-president, W. H. Elliott, general foreman, T. R. R. A., East St. Louis, Ill., and secretary, A. S. Sternberg, master car builder, Belt Railway of Chicago.

Four new members were elected to the executive committee as follows: A. J. Charlton, general car foreman, O. S. N., Buffalo, N. Y.; E. G. Chenoweth, superintendent car department, C. R. I. & P., Chicago; James Bannon, general car foreman, C. P., West Toronto, Canada, and A. G. Richards, traveling car foreman, C. & A., Bloomington, Ill.

I. C. C. Reopens Virginian Case

The Interstate Commerce Commission has granted the petition of the Virginian Railway that it reopen for further hearing the case in which it denied an application of the Virginian for a certificate of public convenience and necessity authorizing the construction of an extension two miles long to reach a coal mine in Wyoming County, W. Va. The application was denied on the ground that additional coal mines were not needed and that the railroad had not been able to furnish an adequate car supply to the mines with which it already connects. The commission also granted a petition of the Pocahontas Fuel Company to intervene in the case. A hearing will be held before Director Mahaffie of the commission's Bureau of Finance at Washington, October 19.

The commission has postponed to a date to be fixed later the hearing on the administration of the fourth section of the commerce act set for October 15 at Washington.

Wage Statistics for July

The monthly returns of Class I carriers to the Interstate Commerce Commission show that since January, 1923, there has been an increase from month to month in the total number of railroad employees. For the month of July, 1923, the summary shows a total of 1,954,687 employees, an increase of 20,758, or 1.1 per cent, as compared with the returns for June, 1923, and exceeds the employment reported for July, 1922, by 486,863, or 33.2 per cent. This abnormal increase resulted partly from the shopmen's strike, which became effective on July 1, 1922, and partly from the larger business of 1923. The total compensation reported for July, 1923, compared with that for June, 1923, shows an increase of $2,677,760, or 1 per cent, and in most cases the average monthly earnings show increases as compared with July, 1922. The monthly earnings, by groups, were as follows:

	Employees reported on daily basis		Employees reported on hourly basis	
Group	July, 1923	July, 1922	July, 1923	July, 1922
Executives, officials and staff assistants	$427	$418	....	....
Professional, clerical and general	178	172	$122	$124
Maintenance of way and structures	238	235	92	82
Maintenance of equipment and stores	244	243	127	135
Transportation (other than train, engine, and yard)	97	92	122	120
Transportation (yardmasters, switch tenders, and hostlers)	259	256	148	153
Transportation (train and engine service)	....	....	189	180

Traffic News

From Edmonton, Alberta, a shipment of 65 tons of butter has been made to Liverpool, England, by way of the Panama Canal.

The proposed advances in rates for season tickets on the roads centering in Boston have been suspended by the Massachusetts Department of Public Utilities until January 15, and public hearings will be held to listen to numerous protests.

W. A. Schumacher has been appointed general traffic manager of the United Fruit Company; office 17 Battery Place, New York City. C. M. Wynns has been appointed assistant general traffic manager, with office at 321 St. Charles street, New Orleans, La.

The Mississippi-Warrior freight barge line reports a deficit from operation in the year ending June 30 of $624,796. It is stated that the whole of this loss was sustained in the first half of the fiscal year, and that the cause was low water in the Mississippi river above Memphis.

The Atchison, Topeka and Santa Fe increased its miles per car per day during August to 36.79, the Eastern lines leading with an average movement of 38.65 miles a day. During the past 12 months, the average movement of cars on the system has not fallen below 31.62 miles per day in any month.

The Nashville, Chattanooga & St. Louis reports that in six months of 1921 the number of passengers carried by it between Nashville, Tenn., and Murfreesboro, 32 miles, was 15,048; while for the corresponding period this year the number was only 4,009; omnibuses carried the rest. A similar comparison is made concerning the traffic between Rome, Ga., and Kingston, 18 miles.

The sixth annual Freight Claim Prevention Conference of the Kansas City Southern was held at Sulphur Springs, Ark., September 29, with an attendance of 125. This is an annual system meeting of officers and representative employees from every branch of the service. J. F. Holden, vice-president, spoke on public relations; F. E. Winburn, representative of the American Railway Association, on the national campaign, and Joe Marshall (A. R. A.) gave a chart talk.

The Freight Claim Department of the Chicago & Alton has completed a 90-day campaign with an educational car containing placards and charts to decrease the amount of damage done to merchandise on the road. The car stopped at 143 cities and towns on the road and 173 meetings were held during the tour. The Freight Claim Department is planning to follow up these lectures with a demonstration car showing the proper and improper handling of various kinds of merchandise.

At the Grain Dealers' National Association convention on October 2 at Des Moines, Iowa, Congressman Sidney Anderson of Minnesota, stated that a carefully worked analysis of freight burdens on different industries and a comparison of freight rates on one commodity to those on another to determine the relative fairness of each, is a prerequisite to intelligent revision of freight rates and that the National Transportation Institute Research Council would pave the way for equitable freight revision. He also said that the farmers will receive $700,000,000 for their wheat and will pay $105,000,000 to carry it to market, while the cotton growers will obtain $1,300,000,000 for their cotton and will pay $40,000,000 to transport it.

I. C. C. Reopens Investigation of Anthracite Rates

The Interstate Commerce Commission proposes to give another opportunity to those who may think that freight rates on anthracite coal are too high, or that the prices of anthracite are too high because of the freight rates. On October 5 it announced a reopening of its investigation into the rates, charges, classifications, regulations and practices governing the transportation of anthracite coal, for further proceedings and such hearings as may be assigned later, after a two-day hearing on the subject at Pittsburgh had been closed by Examiner Desque for lack of witnesses. The commission's investigation was ordered on its own motion on July 9 immediately after the United States Coal Commission had recommended that it make such an investigation, but the hearings brought out mostly railroad witnesses, with a few shippers. The railroad men pointed out that the present anthracite rates were those fixed by the commission several years ago except as they have been affected by the general percentage increases and by one reduction since.

An inquiry at the White House on October 5 as to the President's views on the "failure" of the commission's investigation brought forth the statement that the President had not heard of it, that he did not recall who was the complainant in the case and that he supposed if no complainants appeared at the hearings the commission would represent the public.

Later the commission announced that further hearings will be had at Augusta, Me., October 29; Montpelier, Vt., on October 31; Boston, Mass., on November 2; Albany, N. Y., on November 5; Rochester, N. Y., on November 7; New York City, on November 9; and Philadelphia, Pa., on November 13. The hearings will be held in the United States Court rooms in these cities, except that the Albany hearing will be held in the Public Service Commission's rooms, the New York City hearing will be held in the rooms of the Merchants' Association in the Woolworth Building, and the Philadelphia hearing will be held in the rooms of the Chamber of Commerce.

"The purpose of these hearings," the notice said, "is to afford all interested parties full opportunity to appear and present their grievances, and to submit concrete suggestions as to the action they believe the commission can and should take to afford them relief. The commission cannot gain accurate information of the grievances of shippers and consumers unless they appear at the hearings and fully inform the commission.

"There appears to be a general feeling among the users of anthracite coal that the prices are too high. If this is the fact, the commission desires to be informed how and to what extent, if at all, the rates and practices of the anthracite carrying roads contribute to this result. The hearings will be open for the receipt of any evidence bearing upon the general subject covered by the commission's order for the investigation. Equal opportunity, of course, will be afforded the carriers to submit such direct or rebuttal evidence as they may have."

A FULL LENGTH MAIL CAR is now run regularly on the Broadway Limited Express of the Pennsylvania Railroad between New York and Chicago. Heretofore this train has carried only closed mail pouches, in a combined smoking and baggage car.

P & A

"Lord Renfrew" on the C. P. R.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from October 1 until January 29, the operation of schedules which propose to increase the rates on strawboard and other articles of paper, c.l. from transcontinental groups D, E and J. territory to South Pacific coast and intermediate points.

The commission has suspended from October 1 to January 29, the operation of schedules which propose to eliminate the application of the Chicago basis of joint rates on grain and grain products from Colorado common points and points taking same rates or arbitraries higher to destinations in Wisconsin north of a line from Milwaukee through Watertown, Madison, Lone Rock and west, leaving applicable combination rates which are higher.

The Interstate Commerce Commission has issued a decision disapproving proposed increased rates on petroleum and its products in carloads from lower Mississippi river points to Pensacola, Fla., Mobile, Ala., Gulfport, Miss., and certain intermediate stations. The suspended schedules were ordered cancelled and the proceeding discontinued, but without prejudice to the establishment of rates which have been found by the commission to be reasonable.

The commission has suspended from October 10, and later dates until February 7, 1924, the operation of certain schedules which propose reductions in the rates on various commodities, carloads, from New York piers of the Southern Pacific Company, Atlantic Steamship Lines (Morgan Line) to points in Arizona, California and New Mexico, when routed via water to Galveston, Texas, and the Southern Pacific Company and its subsidiary lines beyond, to the same basis as currently in effect from group D (Chicago) territory points via all-rail routes.

Carload and Less Carload Commodity Rates Between Points in Southern Territory

The Interstate Commerce Commission has suspended until January 18 schedules providing for the cancellation of commodity rates and increases in carload commodity rates from points in southeastern and Carolina territories to points in Mississippi Valley territory to become effective September 20, and subsequent dates.

The rate changes proposed to be made by these schedules may be divided into three general classes as follows: (1) cancellations of various l. c. l. commodity rates; (2) cancellations of c. l. commodity rates under which carriers allege there is no movement; and (3) revised c. l. commodity rates under which there are known to be movements, which revised rates consist of both increases and reductions.

The commission has issued a notice saying that the changes proposed were so numerous that it was impossible to determine the effect of all of them within the time between the receipt of protests by interested shippers and the date on which the schedules were to become effective. The showing made by protestants, however, together with other facts developed, indicated that the schedules should be further investigated.

It is the hope of the commission that many if not all of the issues involved can be settled through a joint conference of the protestants and the carriers. A conference will be held at the offices of the commission, at Washington, on October 23, which all interested parties are invited to attend.

State Commissions

The Railroad Commission of Texas has granted applications of the railroads relating to certain commodity rates, approving the application of rates, to ports where the competition of water routes compels reductions, which are lower than certain intermediate rates.

Court News

Switching Allowance to Shipper Using Another Track Legitimate

The Circuit Court of Appeals, Fifth Circuit, holds that an allowance by a railroad of switching charges for switching done by a shipper, barely covering the cost of the service, is proper, although the shipper uses for the service, by agreement, the track of another railroad instead of building a spur track of its own.—Texas & Pacific v. Thompson, 288 Fed. 167.

Stock Control of Connecting Lines: Traffic Relations Not Affected

The Federal District Court for the Northern District of Georgia holds that the fact that one railroad company owns a controlling interest in another company operating a connecting line does not make such a unification of the lines that they can be regarded as a single line, and the traffic relations between the two companies will be governed by the same rules as those between other connecting lines.—G. S. & F. v. Georgia P. S. C., 289, Fed. 878.

Mine Employee Injured by Railroad on Private Track

The Montana Supreme Court holds that a coal mine operator injured through a railroad company's negligence on a spur track at his employer's plant, must, where he and his employer are operating under the state Compensation Act, seek redress under that act, and cannot maintain an action against the railroad company.—Black v. Northern Pacific (Mont.), 214 Pac. 82.

Abandonment of Entire Road and of Branch

The Federal District Court for the Northern District of New York holds that while a federal court may permit the receiver of a railroad to abandon the entire enterprise if its further operation will result only in the confiscation of the owner's invested capital, it cannot, in the absence of any interstate commerce questions, permit the receiver to abandon a branch without consent of the state in which it operates and from which it holds its franchise.—Pittsburgh & Shawmut Coal Co., v. Delaware & Northern, 289 Fed. 133.

Attractive Nuisance Doctrine Not Applicable to Excavation in Bluff on Right of Way

A railroad company excavated at the base of a natural bluff along its right of way, making it steeper. A boy 13½ years old, while playing in a cave dug into the face of the bluff by other boys, was seriously injured by a large quantity of earth falling on him. The Kansas Supreme Court holds that the case does not come within the attractive nuisance doctrine, which it refuses to extend to cases where the thing or condition complained of is similar to or a reproduction of nature.—Zegar v. Union Pacific (Kan.) 214 Pac. 107.

Division of Rates Not Required to Favor Weaker Carriers

On the application of the Kansas City, Mexico & Orient of Texas, the Interstate Commerce Commission made an order in August, 1922, for a division of joint rates between the Orient System and 13 connecting railroads, designed to relieve the Orient, which claimed to be working at a loss, by deducting from the earnings of the stronger lines a per cent of their gross earnings per mile and applying it to the weaker lines. The 13 railroads concerned sued to enjoin the enforcement of the order. The Federal District Court for the District of Kansas granted permanent injunction, holding that the necessities of a carrier, and the fact that it is being operated at a deficit, is not a sufficient ground for an increase of divisions in favor of the failing carrier. The building of a line into non-supporting territory, or into a field already adequately served cannot be justly debited to other carriers, and as between the latter the fact that some have immediate connections seems wholly negligible as a ground of distinction. Participating carriers in a joint service are entitled to be compensated in proportion to the amount of service and the cost of the service

which they each render, and the fact that one of them is prosperous and the other not will not override the just right of each to a fairly proportionate share out of the joint earnings, whether the amount distributed to each be fully compensatory or be less to each than the value of the services so rendered.—Abilene & Southern v. United States, 288 Fed. 102.

Payments by Companies, Joint Owners of Terminal Company, Held Income Subject to Tax

The Circuit Court of Appeals, Fifth Circuit, holds that an alminal company owning and operating a bridge, the terminal company being organized and owned in equal proportions by three railroad companies, was organized for profit although no dividends were to be paid, and payments by the companies to the terminal company of their proportionate shares of the operating expenses, including taxes and fixed charges, and interest on its mortgage bond indebtedness, constituted income of the terminal company subject to tax under the Federal Revenue Acts of 1916 and 1917.—Hamilton v. Kentucky & Indiana Terminal, 289 Fed. 20.

Car Window Under Control of the Passenger Sitting Nearest It

A passenger on entering a car took a seat at an open window and placed her arm on the window sill. On nearing the next station, eight miles distant, the window sash fell on her arm and injured it. The probability was it was raised by the person who last occupied the seat and was not secured by the safety device. Since it was impossible to say whether the fall of the window was attributable to this cause or to some defect in its construction, the North Carolina Supreme Court holds that the falling of the sash must be ascribed to accident or casualty. The rule of res ipsa loquitur did not apply, the window at the time not being under the immediate management of the railroad but in control of the passenger.—Saunders v. Norfolk & Western (N. Car.), 117 S. E. 4.

Law as to Handholds on Car Roofs Held Applicable to Tenders

The Georgia Court of Appeals holds that the provision of section 2 of the Federal Safety Appliance Act requiring that "all cars having ladders shall also be equipped with secure handholds or grabirons on their roofs at the tops of such ladders," in view of the rule of the Interstate Commerce Commission, conceded to apply to tenders, that: "A suitable metal end or side ladder shall be applied to all tanks more than 48 inches in height, measured from the top of end sill, and securely fastened with bolts or rivets," and the undisputed evidence that a tender (with its locomotive) is within the class of "cars having ladders," and in view also of the general intent and purpose of the act, was properly held applicable to the tender, notwithstanding that a tender, in a strict and literal sense, may have no roof.—Davis v. Maury (Ga. App.) 117 S. E. 283.

MIDDLE-WEST CONGRESSMEN all insist upon cheaper freight transportation, and there is hostility to the Interstate Commerce Commission. Representative McLaughlin of Nebraska would abolish the Interstate Commerce commission and repeal the Esch-Cummins law, restore all of the powers to the state railway commissions. But today every financier and responsible publicist knows that in order to have railroad solvency and a railroad system at all, the unfair exactions of the states must be overruled in the national interest. Prof. J. T. Young, of the University of Pennsylvania, in a recently-published textbook, says truly that within a few years the distinction between interstate and intrastate commerce may "cease to have a practical meaning." And it must be admitted that the tendency is not only logical but desirable. Yet the middle western congressmen, in their insensate wrath, would wreck the nation's regulatory policy if they could not gain their ends by other means. . . . A lowering of rates on farm products, however unjustified on economic grounds, would be a lesser evil than an impairment of the system by which the railroads and the whole public are protected from the exactions of state tribunals, in many cases elected by popular vote and responsive to an irresponsible local demand. And transportation is but one matter in regard to which national thinking is the only alternative to chaos.—*Springfield Republican.*

Foreign Railway News

Reorganization of Alsace-Lorraine Railways

One of the more difficult of the problems of adjustment which the French parliament is called on to solve as the result of the re-incorporation of Alsace-Lorraine into French territory is the relation of the Alsace-Lorraine railways to the French railway legislation. The possibility of operating the Alsace-Lorraine lines directly by the state was at one time considered, Commercial Attache C. L. Jones reports to the Department of Commerce, but this plan has been rejected by the Committee on Public Works of the Chamber of Deputies, which has now drawn up a proposal for a new regime, after having heard at length the representations made by local interests. Under the plan now advocated the Alsace-Lorraine railroads will be operated by the Compagnie de l'Est, but upon a special account and under the direction of an office located at Strasbourg. The proposed plan also provides that the three departments of the restored provinces shall be represented on the Railway Council (Conseil des Chemins de Fer). Employees will retain all rights which they have earned and the special features of the railroad operations, such as fourth class tickets, Sunday tickets, etc., will be conserved.

British Railway Rate Reductions

Effective August 7, 1923, charges on all railways of Great Britain for carriage of merchandise will in no case exceed 50 per cent above pre-war levels (which were those in effect up to January 14, 1920). Existing flat rate additions per ton remain unaltered.

This reduction, Assistant Trade Commissioner H. B. Allin-Smith informs the Commerce Department, is the result of an agreement between the Federation of British Industries and the Railway Rates Tribunal, following active applications for general reductions. All of the four large railway groups have entered the spirit of this concession, the London, Midland & Scottish Railway making the change on August 1, while the London & North Eastern, the Great Western, and the Southern Railway reduced their rates August 7.

This new level applies to all merchandise (including coal) with the exception, first, of certain agricultural products and requisites which are already at the 50 per cent level; and, second, of certain specified traffics for blast furnaces, of which the most important are iron ore and ironstone, these being already at the level of 40 per cent. The reduction is the most comprehensive of the various concessions which have been made since the end of the period of government control in 1921.

China Notes

PEKING.

The principal topic of interest in railway circles at present is the demand by the diplomatic body for the re-organization of the railway police under the direction of foreign officers. The more consideration the Chinese give to this demand the more opposed to it they become. A boycott against British goods is being considered—the impression being current that the demand is of British origin. Granted that the demand is being made in good faith, the Chinese argue that this would be the beginning of a Chinese army under foreign control. The improved discipline and effectiveness of the railway police if officered by foreigners is the argument which the Chinese use against the whole plan.

However, they do not overlook the technical phases of the argument, either, for they point out that the railway police are in no wise responsible for the existence of banditry, nor could any conceivable improvement in the morale of the railway police guarantee the railways from occasional attacks in force by bandits similar to that which occurred near Lincheng in May and which constitutes the reason for the present negotiations. However, many believe that the demand is not made in good faith, but merely as a basis for a trade later on. The desire of British railway interests to secure the same fiscal control over the Tientsin-Pukow line

that they enjoy over the Shanghai-Nanking and the Peking-Mukden lines is well known. In addition, the leases which the British hold over the concessions in Tientsin and Hankow are about to expire. Hence, feelers in that direction are expected. In the meantime, the Ministry of Communications has under active consideration the re-organization of the railway police on its own initiative, consolidating the forces of the various lines, increasing the equipment, and providing for modern drill and discipline.

The first six months of Chinese management of the Shantung Railway have passed with most indications in favor of successful results. The revenues accrued up to July 1 were 30 per cent in advance of those one year ago, in spite of the interruption to the line during the month of February on account of the failure of the Weihsien bridge. The principal criticisms which are heard arise from the condition of the bridges. Following the mishap just mentioned, a careful inspection was made of all the remaining bridges, with the result that none of them were found to be free from cracks and other defects. Hence it has been necessary to put out orders requiring every train to come to a full stop before crossing a major bridge. These eleven additional stops cause trains to arrive late—a circumstance which can not be explained to every passenger. However, new time tables are being issued which will allow for the additional running time required. The management has recently agreed to set aside $100,000 each month for the purpose of replacing these bridges. In order to control the "squeeze" often charged by station masters for the assignment of cars, car distribution has been taken out of the hands of station masters and centralized in the hands of a car distributor in Tsing Tau. The present car distributor is a graduate of the University of Illinois. In fact, all the administrative officers, from the assistant managing director down, are graduates of American colleges. The cleanliness of trains does not suffer from comparison with the same trains under the former management, and the condition of plumbing and similar fixtures has been improved from the run-down condition into which the equipment had been allowed to fall just before the line was turned over. The alacrity with which station masters get the staff out to passing trains, the businesslike way in which passengers are helped off from and on to trains in the effort to shorten station stops creates a definitely agreeable impression. At Tsing Tau, the predicted disarray of streets and parks has not made its appearance, improvements are going forward, and the hotels are reported to be full.

The present summer has witnessed the largest rainfall for several years, but the distribution has been more even. All of the principal lines have suffered minor breaks, but the service has been interrupted a matter of only a few hours at worst. Considering the volume of rainfall just preceding these breaks it is a matter of remark that the breaks were not worse. It seems that the roadbed, openings, and protection work has about reached the point of stability.

The Ministry of Communications has announced a reduction of 25 per cent in fourth class passenger fares in the interest of stimulating greater traffic from the poorer classes.

On August 1, the contiguous railways in China became a single system in fact so far as passenger traffic is concerned. The Lung Hai, Kaifeng-Honan and Shantung railways all put into use through tickets with through baggage service to all points on the contiguous rail lines—thus completing a task which has been under way since the summer of 1913. Through billing of freight is also practically in effect, but is under certain reservations on the Lung Hai line. Although a physical connection has been made between the Tientsin-Pukow and the Shantung lines no interchange of rolling stock has been attempted as yet. Interchange of rolling stock on the Lung Hai has been in force several years, however.

The Ministry of Communications has ordered the railways to accept fractional currency at only its market rates. Thus the dime now is accepted as only nine cents and other coins accordingly. Two or three years ago a standard decimal coinage was attempted and it was made a misdemeanor to accept these coins at less than face value, but the Ministry of Communications has now given notice, in effect, that the demand for "sound" money on the part of Chinese merchants is stronger than the Chinese government.

Equipment and Supplies

Locomotives

THE BALTIMORE & OHIO is inquiring for prices on 15 Pacific type locomotives.

THE ALIQUIPPA & SOUTHERN has ordered one 0-8-0 type locomotive from the American Locomotive Company.

THE LONG ISLAND, reported in the *Railway Age* of September 15 as having authorized the purchase of five heavy freight locomotives, has ordered five switching locomotives from the American Locomotive Company.

THE SOUTHERN PACIFIC, reported in the *Railway Age* of October 6 as inquiring for about 60 locomotives, is asking for 32 2-10-2 type locomotive; 8 Pacific type locomotives and 18 Mountain type locomotives. All the above locomotives will use oil for fuel.

Freight Cars

THE BALTIMORE & OHIO is inquiring for prices on 1,000 mill type gondola cars.

THE MINNEAPOLIS & ST. LOUIS has ordered repairs to 600 box cars at the shops of the General American Car Company.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 200 steel underframes from the American Car & Foundry Company, and has also ordered 10 underframes for caboose cars from the Pennsylvania Tank Car Company.

THE SOUTH AFRICAN RAILWAYS, reported in the *Railway Age* of June 9 as inquiring for from 100 to 500 steel grain cars, has ordered 400 cars from the Leeds Forge Company, England. Mention was also made in the *Railway Age* of July 7 of 100 cars ordered from the Metropolitan Carriage & Wagon Works, Ltd.

Passenger Cars

THE LONG ISLAND, reported in the *Railway Age* of September 15 as having authorized the purchase of 60 steel motor passenger cars for electric service, has placed the order for this equipment with the American Car & Foundry Company.

Signaling

THE ILLINOIS CENTRAL has ordered from the General Railway Signal Company an electric interlocking machine, 39 working levers, together with switch machines, electric locks, etc., for installation by the railroad company's forces at North Gilman, Ill.; also, an eight-lever section and other apparatus for an addition to an electric interlocking at Smithport, La.

Union Signals for Chile

The electrification of the Chilean State Railways from Valparaiso to Santiago, 186 kilometers (116 miles) and the Los Andes branch, 49 kilometers (30 miles) additional, it is anticipated will be completed and all trains electrically operated by January 1. The Union Switch & Signal Company has an order for 515 Style "R" color light signals for these lines; 1189 a. c. relays and impedance bonds, track and line transformers and other apparatus for complete track circuit signaling between Valparaiso and Santiago where the signals are semi-automatic and for manual signaling on the Los Andes branch. Check-locking with electrically locked circuit controllers, including complete track circuit control will be installed on the single track portion of the main line. The construction work will be handled by the railway company's forces under the supervision of W. J. Evans.

Supply Trade News

A. W. Gillespie & Co., 426 South Clinton street, Chicago, has changed its name to the **Ar-an-ess Manufacturing Company,** and will continue the business at the same location as heretofore.

Charles M. Brown, sales manager of the **Colonial Steel Company,** Keystone building, Pittsburgh, Pa., has been elected president and **J. Trautman,** assistant sales manager, has been appointed sales manager to succeed Mr. Brown.

H. A. Wilson has been appointed manager of the Detroit branch of the **Gibb Instrument Company,** Bay City, Mich., succeeding **F. M. Luchs,** resigned. Mr. Wilson was formerly district manager in New York for A. P. Munning & Co.

P. E. Stickler, formerly locomotive engineman on the Southern Pacific and **L. H. Rupert,** formerly locomotive engineman on the Mexico North Western, have been appointed service engineers of the **Franklin Railway Supply Company, Inc.,** New York.

D. S. Murphy has been appointed chief service engineer of the **Franklin Railway Supply Company, Inc.,** New York. Mr. Murphy was born at Visalia, Cal., and attended schools in that state and in Missouri. He began his railroad career in 1903 with the Missouri Pacific in yard and station service. He was connected with the transportation department of that road until 1906, when he joined the operating department of the Missouri, Kansas & Texas at St. Louis. From 1913 to 1917 he was office assistant to president of the M. K. & T. and then to 1918 he served in a similar capacity with the federal manager (United States Railroad Administration) of the group comprising the St. Louis & San Francisco, Missouri, Kansas & Texas and several smaller lines. On March 1, 1918, he was appointed trainmaster of the St. Louis division, Missouri, Kansas & Texas and the following May trainmaster of the Osage division. In September, 1918, he was promoted to superintendent of the Oklahoma district, with headquarters at Oklahoma City, Okla. On March 1, 1920, he was made superintendent of the McAlester district, with office at Muskogee, leaving that position to become chief service engineer of the Franklin Railway Supply Company, Inc., as above noted.

D. S. Murphy

The Missouri Car Company, East St. Louis, Mo., will erect a car equipment shop at Denver, Colo., at an approximate cost of $750,000. The plant will be a duplicate of the company's East St. Louis shop, will manufacture all kinds and types of steam and electric cars and will be known as the Colorado Railway Equipment Company.

The American Foundrymen's Association has made its first award under the John A. Penton fund established two years ago to provide suitable recognition of conspicuous service to the foundry industry and a gold medal will be presented at the next convention to **Enrique Touceda,** consulting metallurgical engineer and professor of metallurgy at Rensselaer Polytechnic Institute, for his achievements in research and improvements of malleable iron.

B. B. Milner, recently from the Orient, will delay his return on account of the earthquake in Japan, and has arranged for an office in room 1237, Knickerbocker Building, New York City. Mr. Milner has been serving the Japanese Government railways and certain railroad supply sources in this country, with his headquarters at Tokio, Japan.

Joseph Wainwright has been appointed sales manager and **W. C. Chapman,** district manager of the Philadelphia (Pa.) district for **Manning, Maxwell & Moore, Inc.,** New York. Messrs. Wainwright and Chapman will have headquarters in the Pennsylvania building, Fifteenth and Chestnut streets. **Walter V. Lawton** has been appointed district manager of the Boston (Mass.) district, with headquarters in the Textile building, 99 Chauncy street.

The Thornburgh Universal Gasket Manufacturing Corporation, Cicero, Ill., has been organized and has taken over the assets of the Universal Gasket & Manufacturing Company, Cicero, Ill. **W. N. Thornburgh,** president and treasurer of the W. N. Thornburgh Manufacturing Company, is also president and treasurer of the new company. **J. J. Meydrech,** vice-president and secretary of the W. N. Thornburgh Manufacturing Company, is also vice-president and secretary of the new company. **George E. Barton** is vice-president and sales manager.

The Link-Belt Company, Chicago, has secured by purchase the Meese & Gottfried Co., of San Francisco, Los Angeles, Seattle and Portland. Meese & Gottfried Co., and its predecessors, have been manufacturers of power transmission machinery and distributors of conveying and transmission machinery on the Coast for many years. The new organization will be known as **Link-Belt Meese & Gottfried Co.,** with headquarters at San Francisco and officers as follows: **Charles Piez,** chairman of the board; **B. A. Gayman,** president; **Harold H. Clark,** vice-president and sales manager; **Leslie W. Shirley,** treasurer, and **Richard W. Yerkes,** secretary.

C. H. Larimer, mechanical expert of the **Westinghouse Air Brake Company** in the New England territory, has been appointed consulting mechanical expert. He is succeeded as mechanical expert by **R. P. Ives,** a locomotive engineman from the New York, New Haven & Hartford. **H. J. Robinson,** for many years mechanical expert of the Westinghouse Air Brake Company at Seattle, Wash., has been appointed superintendent of special training to supervise the special apprenticeship courses for college students at the company's Wilmerding plant. The Westinghouse Company has opened a new branch office at Houston, Tex., in charge of mechanical expert **John Hume,** assisted by **C. A. Breit,** who has been transferred from the company's office at St. Louis.

Obituary

R. A. Hamaker, manager of the Montreal branch of the Canadian Johns-Manville Company, Ltd., was swept off from his boat and drowned, in Lake St. Louis recently. Mr. Hamaker was born in October, 1882, at Reading, Pa. In 1907 he became identified with the Johns-Manville Company, and in 1909 went to Montreal to take charge of the company's interests in that city.

Trade Publications

ELECTRIC MOTORS.—The Reliance Electric & Engineering Company, Cleveland, Ohio, has issued a 32-page booklet on its Type T heavy duty Reliance direct current motors. The booklet includes a detailed, illustrated description of how the motors are built, tables of ratings, general outline dimensions and a large number of illustrations showing motor applications.

THE MISSOURI STATE BOARD OF EQUALIZATION has fixed the final tax assessment for steam railroads operating in that state at $272,014,894 and for electric railways at $65,987,881. The assessment of the Atchison, Topeka & Santa Fe was reduced from $20,486,707 to $19,406,647.

Railway Construction

BALTIMORE & OHIO.—This company will receive bids in the near future for steel to be used in the construction of a pier shed at Baltimore, Md.

CANADIAN NATIONAL.—This company has submitted tentative proposals for the consideration of the city of Edmonton, Alta., in respect to the development of the Canadian National facilities in that city. The work includes the construction of a new station and three subways within a period of five years and other improvements which will be spread over a period of 10 years.

CHICAGO & EASTERN ILLINOIS.—This company has closed bids for the construction of a passenger station at Johnston City, Ill., to cost approximately $20,000.

CHICAGO, BURLINGTON & QUINCY.—This company contemplates the construction of a pipe line from Burlington, Ill., to Galesburg, to cost approximately $1,500. The cost of the construction will be divided among the Burlington, the Illinois Power & Light Company and the City of Galesburg.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has been ordered by the Minnesota Railroad and Warehouse Commission to construct a station with offices and warehouse facilities at Brownsville, Minn., on or before June 1, 1924.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a 13-stall roundhouse at Shawnee, Okla., reported in the *Railway Age* of August 11.

COLORADO & SOUTHERN.—This company is preparing plans for the construction of a station at Trinidad, Colo.

GALVESTON, HARRISBURG & SAN ANTONIO.—This company will construct an addition to its roundhouse at San Antonio, Tex., to cost approximately $60,000.

ILLINOIS CENTRAL.—This company has awarded a contract to the Howlett Construction Company for the construction of a 300-ton reinforced concrete coaling station at Gilman, Ill.

LOUISVILLE & NASHVILLE.—This company is planning to double track the Kentucky & Eastern line of the Cumberland Valley division between Pineville, Kentucky, and Harland, a distance of 39 miles. The work has already been started between Acosta Junction, Kentucky, and Cardinal, the work being done by company forces.

SOUTHERN PACIFIC.—This company is preparing plans for the rearrangement of the yards of the Houston & Texas Central at Dallas, Tex., at an approximate cost of $300,000.

ST. LOUIS-SAN FRANCISCO.—This company has awarded a contract for a one-story coaling station 26 ft. by 28 ft. at St. Louis, Missouri, to the Howlett Construction Company, Moline, Illinois.

THE CANADIAN PUGET SOUND LUMBER & TIMBER COMPANY.—This company will build a logging railway from Sook Harbor, B. C., to Port Renfrew, a distance of 40 miles.

THE PENNSYLVANIA RAILROAD offers $1,000 in prizes in an essay contest, open to all employees, on the subject of "The benefits of employee ownership of stock and securities of the Pennsylvania Railroad through the Employees' Provident and Loan Association." In each of the four operating regions, at Altoona Works, and in the general offices, three prizes are being offered for the best essays written by the employees. The first prize will be two shares of stock [par value $50 per share] in the Pennsylvania Railroad Company, the second prize one share of stock, and the third prize a credit on the books of the Provident and Loan Association amounting to half the cost of one share of stock.

Railway Financial News

ALABAMA GREAT SOUTHERN.—*Annual Report.*—The annual report for the year ended December 31, 1922, issued last week, shows a balance of income over charges of $1,082,430 as compared with $535,090 in 1921. A selection of the principal items in the income account follows:

	1922	1921
Freight	$6,171,637	$6,910,461
Passenger	1,845,890	2,035,374
Total operating revenues	8,524,804	9,542,225
Maintenance of way and structures	994,417	1,177,062
Maintenance of equipment	1,737,193	1,933,307
Traffic	217,624	272,162
Transportation	3,266,259	4,426,152
General	285,239	308,048
Total operating expenses	6,565,760	8,196,320
Net revenue from operations	1,959,044	1,345,905
Taxes	490,600	325,691
Total other expenses	475,135	325,119
Operating income	1,483,909	1,020,786
Total non-operating income	315,470	427,697
Total gross income	1,799,379	1,448,483
Total deductions	716,949	913,393
Balance of income over charges	1,082,430	535,090
Dividends of 7 per cent on preferred stock	236,625	*.....
Dividends of 7 per cent on ordinary stock	548,100	*.....
Balance carried to credit of profit and loss	297,706	535,090

*Dividends of 6½ per cent on preferred and ordinary stock in 1921, charged to profit and loss.

New Director.—Merrell P. Callaway, of New York, has been elected a director to succeed William C. Lane, deceased.

CASTLEMAN VALLEY.—*Authorized to Operate Line.*—The Interstate Commerce Commission has authorized William A. Mogart and the Castleman Valley Railroad Company, to be organized, to operate a line from Worth Junction to Jennings, Md., approximately 14 miles, formerly operated by the Northern Maryland & Tidewater.

CHICAGO & NORTH WESTERN.—*New Director.*—Walter W. Head of Omaha, Neb., has been elected a director to succeed David B. Kimball, deceased.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*New Director.*—Edson Snow Woodworth has been elected a director to succeed David B. Kimball, deceased.

DETROIT, TOLEDO & IRONTON.—*Certificates of Indebtedness Authorized.*—The Interstate Commerce Commission has authorized the issue of $1,000,000 of investment certificates or certificates of indebtedness to employees.

ERIE.—*Asks Authority for Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to assume obligations and liability in respect of $1,500,000 of 6 per cent equipment trust certificates which the application states, it believes can be sold to Drexel & Co., Philadelphia, at 97.

FRUIT GROWERS' EXPRESS COMPANY.—*Equipment Trusts Sold.*—A syndicate headed by the Guaranty Company of New York and Halsey, Stuart & Co. have sold $4,050,000 5½ per cent gold certificates, series C, of 1923, to mature $270,000 each October 15, 1924 to 1938.

GRAND TRUNK.—*Six Months Guaranty Certified.*—The Interstate Commerce Commission has issued a certificate certifying to the Treasury the amount of this company's guaranty for the six months period of 1920 as $1,363,392, of which $761,392 remained to be paid on the final certificate. The commission has also certified $2,171,829 as the amount of the guaranty for the Grand Trunk Western, of which $1,171,629 was due.

GREAT NORTHERN.—*Equipment Trusts Offered.*—J. P. Morgan & Co. and the First National Bank are offering $8,625,000 5 per cent equipment trust certificates, to be issued under the Philadelphia Plan, and to mature serially, 1924 to 1938, at prices to yield 5.20 per cent to 5.50 per cent, according to maturity. Twenty-five per cent of the cost of the equipment upon which the certificates will be secured is to be paid by the railway company. The Interstate Commerce Commission has authorized this issue.

KANSAS CITY TERMINAL.—*Bonds Offered.*—A new issue of $10,000,000 three-year 5½ per cent secured gold notes is being offered

by Lee, Higginson & Co., J. P. Morgan & Co., the Illinois Merchants' Trust Company, and Dillon, Read & Co. at 99¼, to yield about 5¾ per cent. These notes will be a direct obligation of the company, secured by a deposit of $13,783,000 Kansas City Terminal Railway Company first mortgage 4 per cent gold bonds, due 1960.

KEOKUK & DES MOINES.—*Special Meeting.*—A special meeting of the stockholders has been called for October 18 at Des Moines, Iowa, when an election of officers will be held. The annual meetings of the company held in Chicago was adjourned without transacting business because the pressmen's strike in New York prevented the necessary publication of legal notices.

MINNEAPOLIS & ST. LOUIS.—*Bondholders' Committee.*—At the request of various insurance companies, Connecticut savings banks and other holders, the following have agreed to act as a committee for the protection of the interests of the holders of the Minneapolis & St. Louis first and refunding mortgage 4 per cent 50-year gold bonds: James H. Perkins, president, Farmers' Loan and Trust Company; P. Leroy Harwood, vice-president, Mariners' Savings Bank, and James Lee Loomis, vice-president, Connecticut Mutual Life Insurance Company. F. A. Dewey, 22 William street, is secretary.

MOBILE & OHIO.—*Annual Report.*—The annual report for the year ended December 31, 1922, issued this week, shows a balance of income over charges of $1,018,962 as compared with $201,705 in 1921. A selection of the principal items in the income account follows:

	1922	1921
Freight	$15,101,088	$15,345,284
Passenger	1,813,032	1,866,841
Total operating revenues	17,878,005	18,190,180
Maintenance of way and structures	2,139,157	2,487,323
Maintenance of equipment	3,908,679	4,906,173
Traffic	515,336	540,060
Transportation	6,695,226	7,548,454
General	565,267	628,924
Total operating expenses	13,834,221	16,124,530
Net revenue from operations	4,043,784	2,065,650
Taxes	761,596	737,627
Total other expenses	1,330,502	890,676
Operating income	2,713,282	1,174,974
Total non-operating income	3,583	786,670
Total gross income	2,716,865	1,961,644
Total deductions	1,697,903	1,759,938
Balance of income over charges	1,018,962	201,705
Dividend of 4 per cent on common stock	240,672	*
Balance carried to credit of profit and loss	778,290	201,705

*Dividend of $240,672 for 1921 charged to profit and loss.

NATIONAL RAILWAYS OF MEXICO.—*New Directors.*—At the annual meeting of stockholders in Mexico City on October 3, the following new directors, resident in Mexico, were elected: Adolfo de la Huerta, Eduardo Iterbide, Agustin Legorreta, Eduardo Ortiz, Alberto J. Pani, and Adalofo Trieto. Henry Ruhlender and William Wiseman, resident in the United States, were also elected.

NEW YORK CENTRAL LINES.—*The Price of Equipment Trust Certificates Changed.*—The Interstate Commerce Commission has issued a modification of its order authorizing an issue of $17,340,000 of equipment trust certificates so that they may be sold at 94¼ and accrued dividends instead of 95 as provided in the original order.

NEW YORK, CHICAGO & ST. LOUIS.—*Dividend Dates.*—The directors have by resolution provided that action on dividends on both classes of stock of the company shall be considered at board meeting held on the 30th day of January, April, July and October. Dividends, if declared, are to be payable the first day of April, July and October and January 2 to stockholders of record February 15, May 15, August 15 and November 15.

The directors of the company have authorized the purchase of an eight-mile stretch of double track between Silver Creek and Dunkirk, N. Y., which, with the recent acquisition of the Chicago & State Line, gives the Nickel Plate title in fee to all its lines between Buffalo and Chicago.

PENNSYLVANIA RAILROAD.—*Additional Conditions on Lease Imposed.*—The Interstate Commerce Commission has issued an amendment of its orders authorizing leases by the Pennsylvania of the property of its subsidiary companies, the Pittsburgh, Cincinnati, Chicago & St. Louis; Grand Rapids & Indiana; Wheeling Terminal Company; Englewood Connecting; South Chicago Southern; Toledo, Columbus & Ohio; Cleveland, Akron & Cincinnati; Cincinnati, Lebanon & Northern; Pittsburgh, Ohio Valley & Cincinnati, and Ohio Connecting, inserting an additional condition that the lessor company shall not, except in connection with transactions with the federal government, hereafter sell, pledge, or otherwise dispose of the capital stock of the lessee companies without consent of the commission.

READING COMPANY.—*Segregation.*—Stockholders of the Philadelphia & Reading and twelve other subsidiary companies of the Reading Company at special meetings on October 8 approved plans for the merging of the companies with the Philadelphia & Reading Railway and authorized action to be taken by the various companies to carry into effect the segregation plan decreed by the United States District Court in the separation of the Reading's coal and iron properties.

A special meeting of the Reading Company's stockholders will be held October 15 to approve the segregation plan and to increase the indebtedness of the company $64,000,000.

At the annual meeting of the Philadelphia & Reading Coal & Iron Company George C. Coughlin was elected a director to succeed W. D. Pollard, deceased.

SOUTHERN RAILWAY.—*Annual Report.*—See excerpts from annual report for year ended December 31, 1922 on adjacent page.

New Director.—Jeremiah Milbank, of New York, has been elected a director to fill a vacancy.

ST. LOUIS SOUTHWESTERN.—*New Director.*—Henry B. Wallace, president of the Cupples Company, St. Louis, Mo., has been elected a director to fill the vacancy caused by the resignation of Murray Carleton.

UNION PACIFIC.—*Authorized to Convert Bonds.*—This company has been authorized by the Interstate Commerce Commission to convert a £4,000,000 bond into bonds in the aggregate face amount of $20,000,000, to increase the rate of interest from 4 to 5 per cent, to sell the bonds at not less than 97, and accrued interest, and to issue temporary bonds or interim receipts pending the preparation of the bonds in definitive form. The £4,000,000 bond is now held in the treasury and arrangements have been made for the sale of the proposed bonds to Kuhn, Loeb & Co., at 97 and accrued interest.

UNITED NEW JERSEY RAILROAD & CANAL COMPANY.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $1,824,000 of general mortgage 4½ per cent bonds to be delivered to the Pennsylvania in reimbursement of expenditures made by the latter in retirement of certain bonds of the former. The Pennsylvania was also authorized to assume obligation and liability in respect of the bonds, which are to be sold at not less than 90.

Treasury Payments to Railroads

Since last announcement, dated September 1, 1923, payments under Sections 204, 209, 210 and 212 of the Transportation Act, 1920, as amended, have been made by the Treasury as follows:

Section 204:		
Erie & Michigan Railway & Navigation Co.		$16,636
Loranger, Louisiana & Northeastern		7,741
Muncie & Western		21,858
Ouachita Valley Railway		21,304
Uintah Railway		$16,636
Section 209:		
Andalusia, Florida & Gulf		454
Detroit Terminal Railroad		89,171
Kinston Carolina Railroad		2,279
Lorain & West Virginia		36,237
New York Connecting		757,678
Woodworth & Louisiana		2,680
Section 210:		
Seaboard Air Line		1,000,000
Total		$1,979,328
Total payments to September 30, 1923:		
(a) Under Section 204, as amended by Section 212 for reimbursement of deficits during Federal Control:		
(1) Final payments, including partial payments previously made	$7,493,545	
(2) Partial payments to carriers as to which a certificate for final payments has not been received by the Treasury from the Interstate Commerce Commission	668,558	
Total payments account reimbursement of deficits		8,162,103
(b) Under Section 209, as amended by Section 212 for guaranty in respect to railway operating income for first six months after federal control:		
(1) Final payments, including advances and partial payments previously made	220,500,519	

(*Continued on page 697*)

Annual Report

Twenty-ninth Annual Report of Southern Railway Company

RICHMOND, VA., October 9, 1923.

To the Stockholders of
SOUTHERN RAILWAY COMPANY:

The Board of Directors submits the following report of the affairs of the Company:

The income account for the year 1922 was published on February 2, 1923. It showed a balance of $8,823,796 over fixed charges compared with $2,026,622 in 1921 and $1,716,149 in 1920.

CURRENT EARNINGS

The railroad is handling more traffic than ever before, handling it smoothly and without congestion, and at lower average freight rates than have obtained for several years. The figures for the first eight months of the current year now available are as follows:

	Eight Months to August 31, 1923	Eight Months to August 31, 1922	Increase or *Decrease*	Per Cent
OPERATING REVENUES:				
Freight	$70,022,040	$55,635,052	$14,386,988	25.86%
Passenger	22,239,660	19,543,802	2,695,858	13.80%
Express	1,653,913	1,077,136	576,777	53.54%
Mail	1,905,058	1,901,408	3,650	0.19%
Miscellaneous	3,596,708	3,241,108	355,600	10.97%
Total	$99,417,379	$81,398,506	$18,018,873	22.14%
OPERATING EXPENSES:				
Maintenance	$33,014,543	$25,989,356	$7,025,187	27.04%
Transportation	36,894,018	32,689,910	4,204,108	12.86%
Traffic	1,856,134	1,667,954	188,180	11.28%
General	2,548,737	2,543,594	5,143	0.20%
Miscellaneous	693,915	630,027	63,888	10.14%
Total	$75,007,347	$63,520,841	$11,486,506	18.08%
Taxes	$4,555,494	$3,734,938	$820,556	21.97%
Hire of Equipment—Net Debit	1,580,285	2,350,625	*770,340*	*32.77%*
Joint Facilities—Net Debit	565,397	498,156	67,241	13.50%
Uncollectible Railway Revenues	17,797	61,077	*43,280*	*70.87%*
OPERATING INCOME	$17,691,059	$11,232,869	$6,458,190	57.49%
Operating Ratio	75.45	78.04		
Transportation Ratio	37.11	40.16		
Percentage of Total Expenditures Devoted to Maintenance	44.02	40.91		
Percentage of Total Expenditures Devoted to Transportation	49.19	51.46		

LOWER FREIGHT RATES

This comparative improvement has been liberally shared with our shippers.

The substantial reductions in freight rates, first on farm products and later on all traffic, are reflected in a decrease of 12% in the average receipts per ton mile for the first six months of 1923 compared with the same months of 1922, or, to state it another way, while the number of tons of freight carried per train mile increased 8.31% the freight revenue per train mile declined 4.18%.

While average freight charges are 40% above the prewar level, railroad wages have advanced 80%, coal for locomotives more than 100%, materials generally 50%, and taxes 250%.

With cotton selling at more than a quarter of a dollar a pound, the average charge for carrying it is a quarter of a cent, about the equivalent of the usual daily fluctuation in the market price.

Despite lower freight rates and high wage scales and material prices, the results stated have been achieved by an increased volume of traffic.

HIGHER TAXES

Given a fair distribution of the burden of taxation, no complaint should be made of an increase in taxes even at the rate of 250% if the money thus made available to the tax gathering authorities is no more than is required for the economical administration of governmental functions. It seems pertinent, however, to draw attention to the purposes for which taxes are currently collected.

The ready market created by the exemption of state, county and municipal securities from Federal income taxes has laid a heavy burden on a railroad. By reason of the outpouring of municipal securities with this privilege a railroad which seeks to provide for the expansion of transportation facilities required in the public service must pay higher interest rates successfully to compete in the money market. Furthermore, as a taxpayer it contributes toward the burden of carrying a public debt which is greater proportionately because investments in these securities escape taxes. Finally, as a going business concern a railroad suffers a loss of both passenger and freight traffic to motor cars using the highways to the building of which a large proportion of the money derived from these tax exempt securities is devoted.

For these considerations it seems appropriate here to invite attention to the aggregate of tax exempt public securities which have been issued during five years from the twelve states into which the lines of Southern Railway System extend.

	1918	1919	1920	1921	1922	Five Years
Highways	$11,223,000	$71,487,000	$55,715,000	$116,646,000	$108,877,000	$363,948,000
Water, Sanitary and Lights	7,501,000	11,150,000	16,403,000	31,607,000	44,007,000	110,668,000
Schools	5,779,000	16,037,000	20,911,000	36,093,000	39,915,000	118,735,000
Refunding	10,356,000	10,639,000	20,434,000	17,231,000	23,091,000	81,751,000
Miscellaneous and not classified	14,950,000	28,191,600	20,873,000	60,370,000	46,688,000	171,072,000
TOTALS	$49,809,000	$137,504,000	$134,336,000	$261,947,000	$262,578,000	$846,174,000

NEW EQUIPMENT

Sixty-two locomotives, 2,470 new freight cars and three new dining cars have been acquired through orders placed last spring. The cost of this equipment was $8,445,000, and the money was provided partly from current treasury funds and the remainder from the sale of $6,750,000 Series "X" 5% equipment trust certificates, dated April 2, 1923, payable in thirty equal semi-annual installments. With a volume of freight traffic in the first eight months of 1923 nearly forty per cent. heavier than in the same months of the previous year, the net charge against the Company for hire of equipment was reduced $770,340, or 32.77%.

BUSINESS CONDITIONS

Undoubtedly prosperity prevails in the South.

Industries of the South, with few exceptions, have been running full time and have found profitable markets for their products.

The growth of the Southern cotton textile industry has continued despite high costs of mill construction and machinery. During the twelve months ended July 31, 1923, there was a net increase of 371,000 spindles in Southern mills. This compares with a net increase of 80,000 spindles in mills in states outside of the South. Additional mills are under construction in the South, assuring a continuance of this growth.

An important phase of Southern textile development during the year, not reflected in statistics of spindles, is the expansion in the dyeing, bleaching and finishing of cotton goods. Two large finishing plants have gone into operation during the past year and three others are now being built.

The Southern iron and steel industry has had a prosperous year and important additions are being made to plant capacity. The same is true of the lumber and cement industries.

Building activities have continued throughout the year. A noteworthy feature of the building record has been the large number of school houses built in both urban and rural communities.

With the spread of diversified farming and live stock husbandry agricultural conditions in the South are steadily improving.

The Georgia peach crop amounted this year to 8,800 cars, an increase of about 1,500 cars over 1922.

The present outlook is for a substantially larger apple crop in the South than has been gathered for several years.

Tobacco production in the new south Georgia district is increasing rapidly and is producing a substantial traffic for the railroad.

To all officers and employees who have faithfully and efficiently performed their duties the thanks of the Board of Directors again are tendered.

Respectfully submitted, by order of the Board,

FAIRFAX HARRISON,
President.

TABLE 1.—INCOME STATEMENT

	1922	1921
OPERATING REVENUES:		
Freight	$88,091,271.82	$85,185,081.64
Passenger	30,264,513.62	32,104,922.09
Miscellaneous Passenger-Train	1,011,274.09	977,457.21
Mail	2,895,131.29	3,373,069.76
Express	2,123,943.67	2,649,455.14
Other Transportation	1,382,463.59	1,258,256.26
Incidental	1,970,737.25	2,292,062.57
Joint Facility	750,511.78	874,845.34
TOTAL OPERATING REVENUES	$128,489,847.11	$128,715,150.01
OPERATING EXPENSES:		
Maintenance of Way and Structures	$17,295,516.53	$19,287,487.46
Maintenance of Equipment	21,927,548.14	23,396,099.60
Traffic	2,479,929.27	2,556,857.51
Transportation	50,754,013.50	55,443,873.12
Miscellaneous Operations	954,922.06	1,055,085.09
General	3,760,406.66	4,096,996.90
Transportation for Investment—Credit	*2,203.02*	*7,392.72*
TOTAL OPERATING EXPENSES	$97,170,133.14	$105,829,006.96
NET REVENUE FROM OPERATIONS	$31,319,713.97	$22,886,143.05
TAXES	$5,763,689.46	$4,582,292.92
UNCOLLECTIBLE REVENUES	89,821.17	85,042.89
HIRE OF EQUIPMENT	4,213,018.62	3,407,707.62
JOINT FACILITY RENTS	780,406.70	839,317.71
TOTAL OTHER EXPENSES	$10,846,935.95	$8,914,361.14
OPERATING INCOME	$20,472,778.02	$13,971,781.91
NON-OPERATING INCOME:		
Income from Lease of Road	$62,096.62	$207,299.84
Miscellaneous Rent Income	268,967.95	263,558.35
Income from Rail Leased	108,587.05	99,902.36
Dividend Income	2,951,025.54	2,112,894.73
Income from Funded Securities	632,487.69	888,535.41
Income from Unfunded Securities and Accounts	463,806.02	652,568.93
Miscellaneous Income	*3,503.42*	14,453.80
TOTAL NON-OPERATING INCOME	$4,483,467.45	$4,239,193.42
TOTAL GROSS INCOME	$24,956,245.47	$18,210,975.33

DEDUCTIONS FROM TOTAL GROSS INCOME:		
Rent for Leased Roads	$2,556,759.81	$2,586,420.94
Miscellaneous Rents	36,142.15	11,322.03
Separately Operated Properties	528,304.93	574,687.34
Interest on Unfunded Debt	191,928.74	663,725.49
Miscellaneous Income Charges	177,552.26	145,638.70
TOTAL DEDUCTIONS OF THIS CLASS	$3,490,687.89	$3,981,794.50
TOTAL AVAILABLE INCOME	$21,465,557.58	$14,229,180.83
INTEREST ON FUNDED DEBT	$11,629,788.98	$11,061,795.31
INTEREST ON EQUIPMENT OBLIGATIONS	785,964.00	914,754.75
DIVIDEND ON SOUTHERN RAILWAY—MOBILE AND OHIO STOCK TRUST CERTIFICATES	226,008.00	226,008.00
TOTAL DEDUCTIONS OF THIS CLASS	$12,641,760.98	$12,202,558.06
BALANCE OF INCOME OVER CHARGES	$8,823,796.60	$2,026,622.77
DIVIDEND OF 2½% ON PREFERRED STOCK PAID NOVEMBER 15, 1922	1,500,000.00	.....
MISCELLANEOUS APPROPRIATIONS OF INCOME	.....	7,252.37
BALANCE CARRIED TO CREDIT OF PROFIT AND LOSS	$7,323,796.60	$2,019,370.40

TABLE 2.—PROFIT AND LOSS

Credit Balance December 31, 1921		$55,440,795.43
Add:		
Credit Balance of Income for the Year	$7,323,796.60	
Net Miscellaneous Credits	381,216.36	
		7,705,012.96
		$63,145,808.39
Deduct:		
Property Retired	$171,000.40	
Discount of Securities	2,913,455.29	
		3,084,455.69
Credit Balance December 31, 1922		$60,061,352.70

TABLE 3.—GENERAL BALANCE SHEET

ASSETS

	December 31, 1922	December 31, 1921
INVESTMENTS:		
Investment in Road	$351,338,736.06	$349,621,233.47
Investment in Equipment	94,940,839.63	90,183,524.90
Total Investment in Road and Equipment	$446,279,575.69	$439,804,758.37
Cash Deposited in Lieu of Mortgaged Property Sold	$456,650.00	$6,800.00
Miscellaneous Physical Property	$1,005,461.82	$989,206.59
INVESTMENTS IN AFFILIATED COMPANIES:		
Stocks	$35,224,658.76	$35,224,658.76
Bonds	25,936,072.69	26,307,912.28
Notes	4,448,896.53	4,535,655.53
Advances	4,119,201.08	3,873,143.96
Total Investments in Affiliated Companies	$69,728,829.06	$69,941,370.53
OTHER INVESTMENTS:		
Stocks	$93,908.00	$94,008.00
Bonds	2,643,913.45	2,658,913.45
Notes	193,836.02	421,460.24
Advances for Purchase of Additional Equipment	5,921,846.50	.....
Total Other Investments	$8,853,503.97	$3,174,381.69
Total Investments	$526,324,020.54	$513,916,517.18
CURRENT ASSETS:		
Cash	$14,158,943.26	$8,097,605.58
Special Deposits	2,885,448.80	8,475,700.50
Loans and bills receivable	29,152.61	867,662.92
Traffic and Car Service Balances Receivable	1,578,482.03	2,720,022.19
Balances due from Agents and Conductors	155,170.36	312,615.45
Miscellaneous Accounts Receivable	8,477,471.26	7,006,758.98
Material and Supplies (Table 11)	12,374,602.93	13,473,154.76
Interest and Dividends Receivable	1,052,518.06	1,277,280.99
Other Current Assets	438,664.63	540,526.22
Total Current Assets	$41,150,453.94	$42,771,327.59
DEFERRED ASSETS:		
Working Fund Advances	$51,993.78	$48,836.78
Cash and Securities in Insurance Fund	879,450.32	1,246,037.33
Cash Deposited under North Carolina Railroad Lease	175,000.00	175,000.00
Other Deferred Assets	74,065.40	86,383.33
Total Deferred Assets	$1,180,509.50	$1,556,257.44
UNADJUSTED DEBITS:		
Insurance Premiums and Rents paid in Advance	$9,821.54	$18,228.58
Discount on Funded Debt	253,715.62	.....
Additions and Betterments Expenditures: Foreign Mileage and Sundry Items in Suspense	4,361,829.91	3,329,108.22
Total Unadjusted Debits	$4,625,367.07	$3,347,336.80

Securities of the Company held by it:	1922	1921
Unpledged	$46,171,200.00	$25,569,200.00
Pledged	.....	48,014,000.00
Totals	$46,171,200.00	$73,583,200.00
GRAND TOTALS	$573,280,351.05	$561,591,439.01

LIABILITIES

	December 31, 1922	December 31, 1921
CAPITAL STOCK:		
Common	$120,000,000.00	$120,000,000.00
Preferred	60,000,000.00	60,000,000.00
Total Southern Railway Company Stock	$180,000,000.00	$180,000,000.00
Southern Ry.-Mobile & Ohio Stock Trust Certificates	$5,650,200.00	$5,650,200.00
LONG TERM DEBT:		
Funded Debt (Table 4)	$239,213,500.00	$237,318,500.00
Equipment Trust Obligations (Table 5)	22,416,600.00	15,773,800.00
Total Long Term Debt	$261,630,100.00	$253,092,300.00
Total Capital Liabilities	$447,280,300.00	$438,742,500.00
GOVERNMENTAL GRANTS:		
Grants since July 1, 1914, in aid of Construction	$214,550.34	$84,078.58
CURRENT LIABILITIES:		
Loans and Bills Payable	.....	$5,954,270.00
Traffic and Car Service Balances Payable	$2,137,152.80	2,023,634.11
Audited Accounts and Wages Payable	14,956,767.56	14,592,011.25
Miscellaneous Accounts Payable	1,545,733.42	2,399,027.75
Interest Matured, including interest due January 1st	2,816,452.50	2,925,320.70
Dividends Matured Unpaid	6,192.50	820.00
Funded Debt Matured Unpaid	62,833.80	32,589.80
Unmatured Dividends Accrued	56,502.00	56,502.00
Unmatured Interest Accrued	1,907,621.49	1,824,735.32
Unmatured Rents Accrued	323,947.33	320,804.96
Expenses Accrued not vouchered	1,736,242.59	1,490,511.86
Other Current Liabilities	1,348,646.36	1,089,735.58
Total Current Liabilities	$26,898,092.35	$32,709,963.33
DEFERRED LIABILITIES:		
Sundry Deferred Liabilities	$1,614,778.08	$1,291,545.53
UNADJUSTED CREDITS:		
Taxes	$1,899,764.30	$1,251,395.94
Insurance Reserve	1,279.450.32	1,246,037.33
Operating Reserves	1,339,825.61	1,304,255.11
Depreciation accrued on:		
Rail Leased to Other Companies	144,144.73	131,268.41
Equipment Owned	25,325,088.81	24,674,114.84
Equipment Leased from Other Companies	622,125.13	630,662.48
Sundry Items	4,769,753.08	2,308,488.66
Total Unadjusted Credits	$35,380,151.98	$31,546,222.77
CORPORATE SURPLUS:		
Additions to Property, sine June 30, 1907, through Income and Surplus	$1,809,552.42	$1,754,740.19
Miscellaneous	21,593.18	21,593.18
Total Appropriated Surplus	$1,831,125.60	$1,776,333.37
Profit and Loss—Balance	$60,061,352.70	$55,440,795.43
GRAND TOTALS	$573,280,351.05	$561,591,439.01

[ADVERTISEMENT]

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(2) Advances to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	179,397,093	
(3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above	81,599,922	
Total payments, account of said guaranty		481,497,534
(c) Under Section 210 for loans from the revolving fund of $300,000,000 therein provided		339,000,667
Total		$828,660,304

Repayments on loans under Section 210 have been made to the amount of $146,397,558.

Trend of Railway Stock and Bond Prices

	Oct. 9	Last Week	Last Year
Average price of 20 representative railway stocks	60.25	59.60	72.35
Average price of 20 representative railway bonds	82.04	81.52	88.65

Railway Officers

Financial, Legal and Accounting

James Williams, assistant treasurer and paymaster of the Chicago & Alton with headquarters at Chicago, has been promoted to treasurer with the same headquarters, succeeding **H. E. R. Wood,** who retired on October 1.

G. J. Bunting, controller of the Illinois Central, with headquarters at Chicago, has been promoted to vice-president in charge of the accounting and treasury departments, with the same headquarters. He was born at Portsmouth, Va., July 14, 1881, and entered railway service in 1900 as general accountant for the Cashie & Chowan in North Carolina, a position which he later relinquished to become associated in an accounting capacity consecutively with the Audit Company of New York and the Indiana Audit Company, in which service he remained until May, 1909, when he was appointed examiner of accounts for the Interstate Commerce Commission. He re-entered railway service on July 15, 1911, as general accountant for the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, which position he held until March 15, 1913, when he was promoted to assistant general auditor. He left the service of this road on November 1, 1920, to become assistant director of the Bureau of Finance of the Interstate Commerce Commission, in which capacity he was engaged in effecting settlements between the carriers and the government for the guarantee period until May 15 of the current year when he resigned to become controller of the Illinois Central, which position he had held until his recent promotion.

G. J. Bunting

Operating

J. W. Brunton, chief clerk to the superintendent of telegraph of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been promoted to superintendent of telegraph, with the same headquarters, succeeding **J. M. Walker,** retired.

C. E. Green, superintendent of the Des Moines Valley division of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Ia., has been promoted to assistant to the general manager of the First district, with the same headquarters. **H. J. Sewell,** superintendent of the Southern division, with headquarters at Fort Worth, Tex., has been promoted to assistant to the general manager of the Second district, with headquarters at El Reno, Okla. **J. A. McDougal,** superintendent of the Oklahoma division, with headquarters at El Reno, Okla., has been appointed superintendent and master mechanic of the newly consolidated Oklahoma-Southern division, with headquarters at Fort Worth, Tex. **C. G. Smith,** trainmaster, with headquarters at Trenton, Mo., has been transferred to Eldon, Iowa, succeeding **J. A. Sullivan,** who has been transferred to Trenton, Mo. **C. F. Redans,** trainmaster, with headquarters at Cedar Rapids, Iowa, has been transferred to Amarillo, Tex., succeeding **R. K. Bradford,** who has been granted leave of absence. **F. A. Bogue** has been appointed trainmaster, with headquarters at Cedar Rapids, Iowa, succeeding Mr. Redans.

Mechanical

Don Nott, roundhouse foreman of the Chicago, Burlington & Quincy with headquarters at Galesburg, Ill., has been promoted to assistant master mechanic, with the same headquarters, succeeding H. H. Urbach, promoted.

P. J. Colligan, master mechanic of the Chicago Terminal division of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been promoted to superintendent of motive power of the Second district, with headquarters at El Reno, Okla., succeeding **W. J. O'Neill,** whose appointment as general superintendent of motive power of the Denver & Rio Grande Western was reported in the *Railway Age* of September 8. **C. B. Dailey,** master mechanic of the Cedar Rapids-Minnesota division, with headquarters at Cedar Rapids, Iowa, has been transferred to Chicago, succeeding Mr. Colligan. **T. W. McCarthy,** master mechanic of the Kansas division, with headquarters at Horton, Kan., has been transferred to Cedar Rapids, Iowa, succeeding Mr. Dailey.

Engineering, Maintenance of Way and Signaling

J. W. Sexton has been appointed division engineer of the Seaboard Air Line with headquarters at Raleigh, N. C.

A. C. Bradley, division engineer of the Nebraska-Colorado division of the Chicago, Rock Island & Pacific, with headquarters at Fairbury, Neb., has been transferred to the Missouri division, with headquarters at Trenton, Mo., succeeding A. C. Shields, whose appointment as engineer maintenance of way of the Denver & Rio Grande Western was reported in the *Railway Age* of September 1. **E. F. Manson,** assistant engineer, with headquarters at Chicago, has been promoted to division engineer of the Nebraska-Colorado division, with headquarters at Fairbury, Neb., succeeding Mr. Bradley. **L. J. Hughes,** division engineer of the Chicago Terminal division, with headquarters at Chicago, has been made assistant engineer, with the same headquarters, succeeding Mr. Manson. **J. L. Hayes,** division engineer of the Illinois division, has been given extended territory to include the Chicago Terminal division, the position of division engineer of the Chicago Terminal division having been abolished.

Obituary

W. F. Ryan, formerly stationer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, died in that city on September 25 from heart disease.

H. C. Hilbourne, general agent passenger department of the Chicago Great Western, with headquarters at Chicago, died in Chicago on October 5 from heart disease.

Byron F. Hobart, formerly president of the San Pedro, Los Angeles & Salt Lake, which later became the Los Angeles & Salt Lake railroad of the Union Pacific system, died at his home at San Diego, Cal., on October 4. He was the grandson of the late Earl of Nottingham and during his business career was president of the National Bank of Commerce of Kansas City, Mo., and also the First National Bank of Springfield. He retired from business activities in 1914.

L. J. Polk, former vice-president and general manager of the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., died at Temple, Tex., on September 30. Mr. Polk was born on August 14, 1854, at Columbia, Tenn., entering railway service in 1874 as a clerk in the general freight office of the Atlantic & Great Western at Cincinnati, Ohio. He subsequently served in various capacities on the Galveston, Harrisburg & San Antonio, the Southern Pacific and the San Antonio & Aransas Pass, being appointed general freight agent on the last named road in November, 1888. On May 1, 1893, he was appointed general freight agent for the Gulf, Colorado & Santa Fe and on August 1, 1896, was promoted to acting general manager. Mr. Polk was promoted to general manager in 1897 and in January, 1902, was elected second vice-president and general manager. He retired from railway service in May, 1904.